

## Appendix A

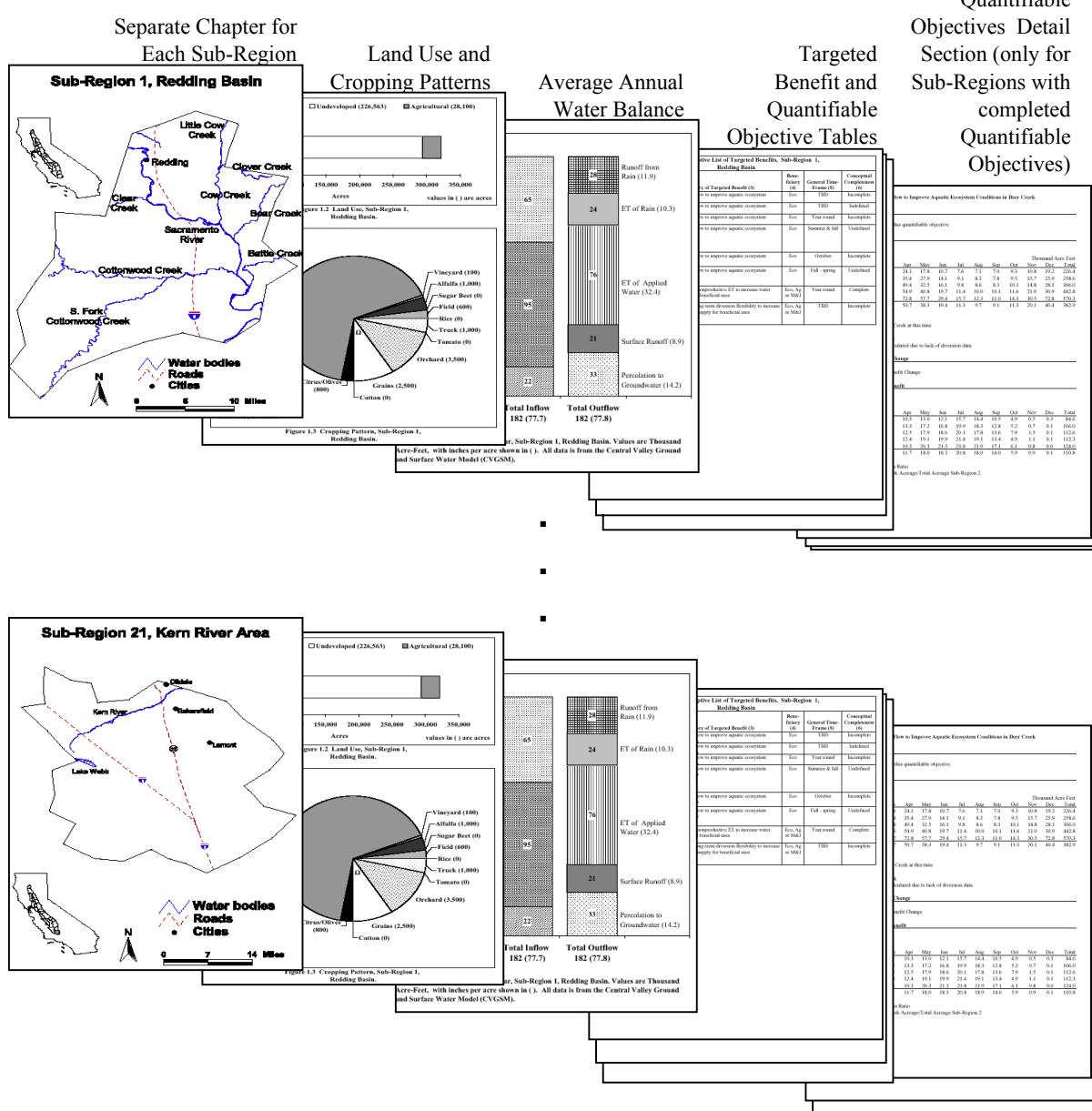
### Complete List of Quantifiable Objectives by Sub-Region

Appendix A contains a list of the completed and potential Quantifiable Objectives (QOs). To-date, 196 potential QOs have been identified. Of these, approximately 50 have been completed. WUE proposals that incorporate completed QOs will be given extra weight in the selection process.

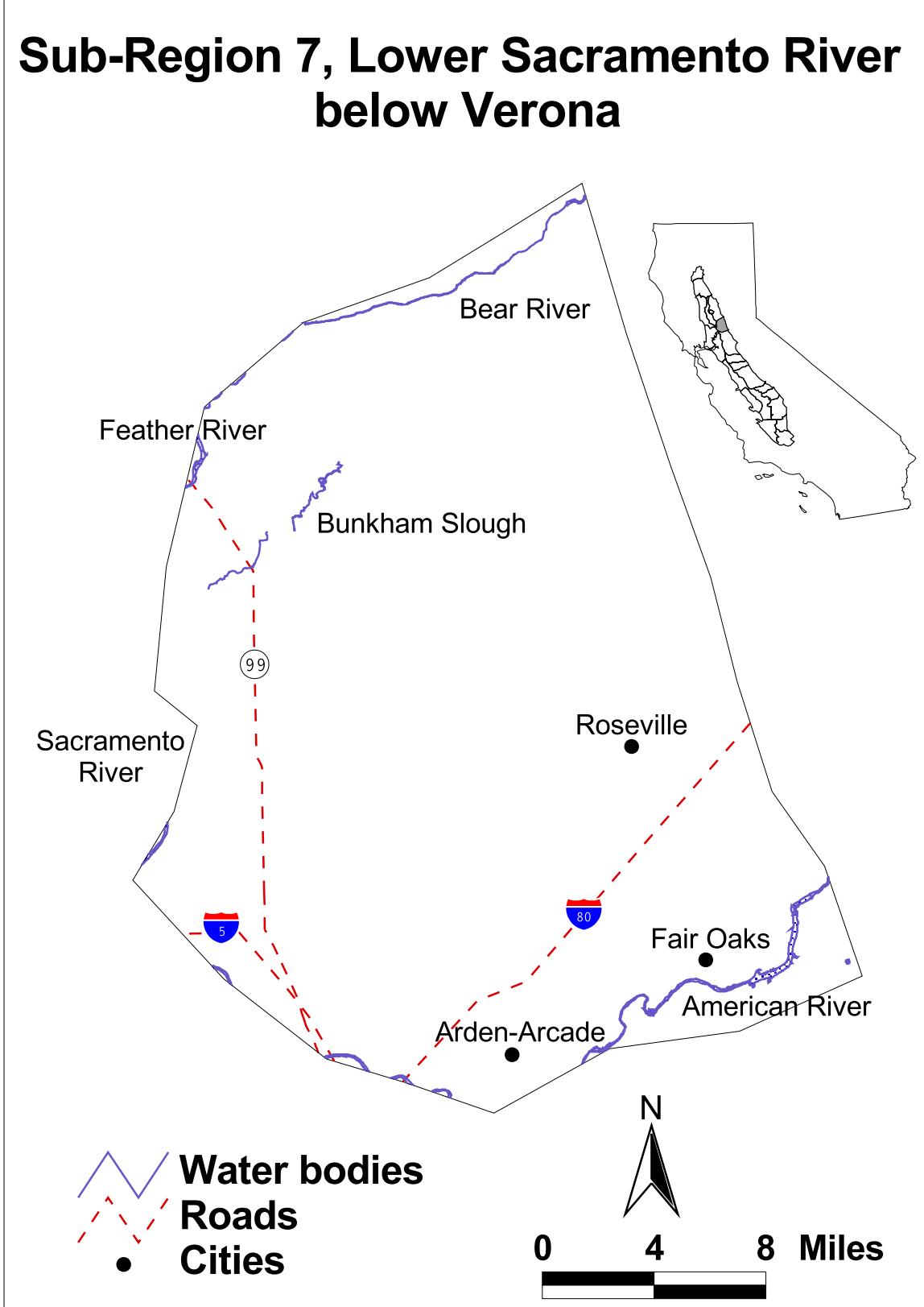
Readily available data does not exist to allow completion of the remaining QOs. However, approximately 45 of the uncompleted QOs have been identified as high priority, and proposals that are linked to these priority outcomes (or Targeted Benefits) will also receive extra weight in the selections (although not as much weight as those that incorporate completed QOs).

Appendix A is organized into 21 chapters that correspond to the 21 Sub-Regions defined in the QO analysis. Each chapter contains background information and details as illustrated in Figure A.I.

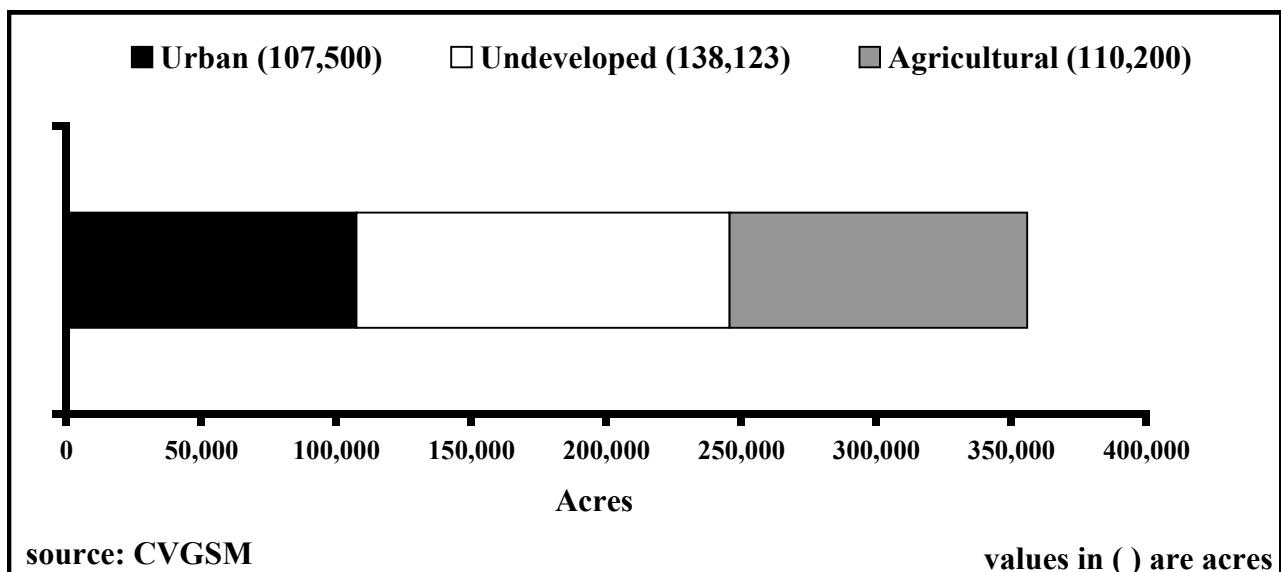
**Figure A.I. Organization of Appendix A**



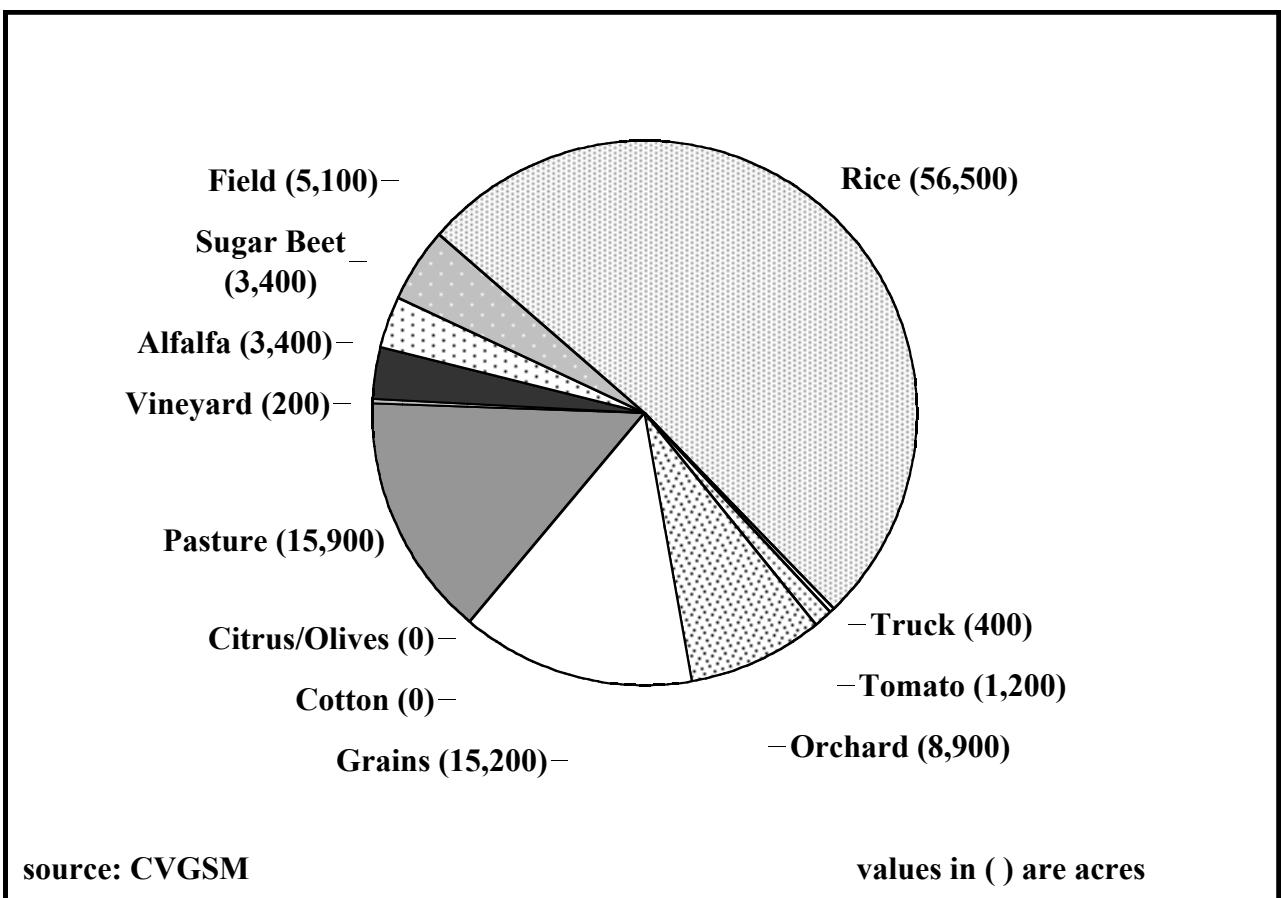
## **Sub-Region 7, Lower Sacramento River below Verona**



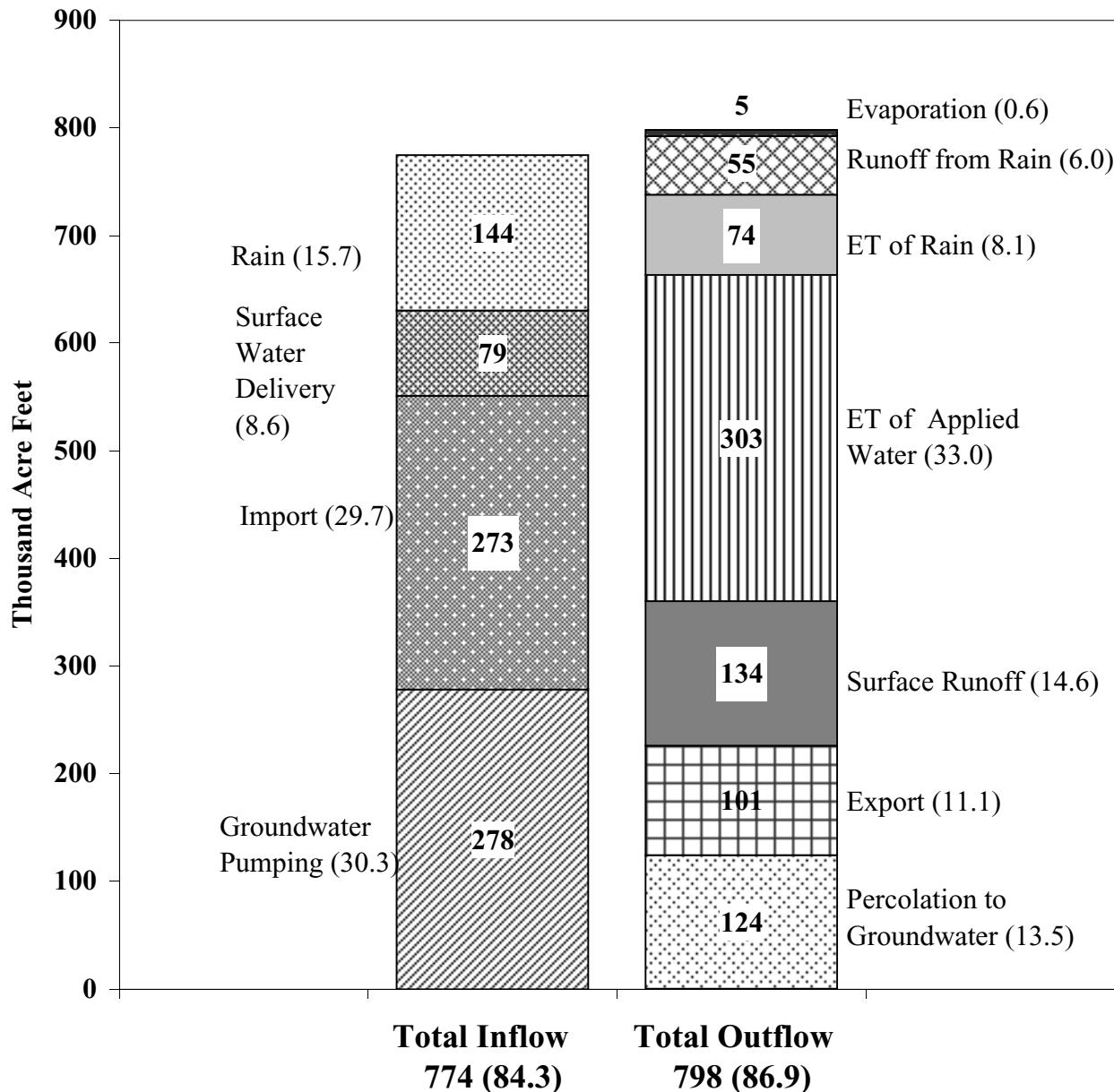
**Figure A.7.2 Land Use, Sub-Region 7,  
Lower Sacramento River below Verona.**



**Figure A.7.3 Cropping Pattern, Sub-Region 7,  
Lower Sacramento River below Verona.**



## Sub-Region 7 Water Balance



**Farm Water Balance, Average Year, Sub-Region 7, Lower Sacramento River below Verona.**  
**Values are Thousand Acre-Feet, with inches per acre shown in ( ). All data is from the**  
**Central Valley Ground and Surface Water Model (CVGSM).**

**Table A.7.1. Descriptive List of Targeted Benefits, Sub-Region 7,  
Lower Sacramento River below Verona**

TB # (1) [duplicate]	Location (2)	Category of Targeted Benefit (3)	Beneficiary (4)	General Time- Frame (5)	Conceptual Completeness (6)
55	American River	Flow: Provide flow to improve aquatic ecosystem conditions	Eco	Year round	Incomplete
56	Bear River	Flow: Provide flow to improve aquatic ecosystem conditions	Eco	Year round	Incomplete
57 [6, 13, 20, 30, 75]	Sacramento River below Keswick	Flow: Provide flow to improve aquatic ecosystem conditions	Eco	Fall - spring	Undefined
58	Natomas East Main Drain	Quality: Reduce pesticides to enhance and maintain beneficial uses of water	Eco or M&I	TBD	Complete
59 [52]	Sacramento River	Quality: Reduce pesticides to enhance and maintain beneficial uses of water	Eco or M&I	TBD	Complete
60	Natomas Drain	Quality: Reduce salinity to enhance and maintain beneficial uses of water	Ag or M&I	TBD	Complete
61	American River	Quality: Reduce temperatures to enhance and maintain aquatic species populations	Eco	Year round	Incomplete
62	Bear River	Quality: Reduce temperatures to enhance and maintain aquatic species populations	Eco	TBD	Incomplete
63	All affected lands	Quantity: Decrease nonproductive ET to increase water supply for beneficial uses	Eco, Ag or M&I	Year round	Complete
64	All suitable lands	Quantity: Provide long-term diversion flexibility to increase the water supply for beneficial uses	Eco, Ag or M&I	TBD	Incomplete
65 [27, 35, 48, 54, 73]	Wetlands	Quantity: Provide long-term diversion flexibility to increase the water supply for beneficial uses	Eco	Variable	Incomplete

**Table A.7.2. Quantified Targeted Benefits, Sub-Region 7,  
Lower Sacramento River below Verona**

TB # (1) [duplicate]	Source and Description of Quantified Targeted Benefit (7)
55	ERPP: Develop and implement an ecologically based streamflow regulation plan with various flow regimes. For example, for the lower American River in <u>Wet</u> years: July – Feb. 2500 cfs. Flows should be accompanied with the specified 10 day pulse flows, such as in <u>Wet</u> March: 6000-7000 cfs. Lower American River flow events should be coordinated with other Sacramento Valley flows.
56	ERPP: Supplement flows in the Bear River to improve conditions for all chinook salmon and steelhead life stages. Provide a flow event of 300 to 500 cfs in dry years. Recommended minimum flows on the Bear River are as follows: Oct. 1-14, 100 cfs; Oct. 15 – June, 250 cfs; July – Sept., 10 cfs.
57 [6, 13, 20, 30, 75]	ERPP: More closely emulate seasonal streamflow patterns in dry and normal year- types by allowing a late-winter or early-spring flow event of approximately 8,000 to10,000 cfs in dry years and 15,000 to 20,000 cfs in below normal water-years to occur below Keswick Dam; Maintain base flows of 6,000 to 8,000 cfs during fall.
58	303(d): Reduce diazinon to _____.
59 [52]	303(d): Reduce diazinon to _____.
60	Core: Reduce electrical conductivity to less than ____ (dS/m) to allow municipal treatment facilities the flexibility to meet the potential long-term regulatory scenario.
61	ERPP: Maintain lower American River water temperatures in the spawning and rearing reach between Arden Bar and Nimbus Dam at or below 60°F beginning as early in October as possible, based on annual coldwater pool availability and maintain water temperatures in the upper portion of the reach between Nimbus Dam and Sunrise Bridge below 65°F from spring through fall; Maintain a daily average water temperature below 65°F from June 1 through September 30 in the lower American River between Nimbus Dam and Watt Avenue and in the upper portions of Coon Creek, Doty Creek, Auburn Ravine, Miners Ravine, and Secret Ravine in the American Basin
62	ERPP: Improve water quality conditions in the Feather, Yuba, and Bear rivers to benefit anadromous fish.
63	Core: Reduce unwanted ET by _____ acre-feet per year.
64	Core: Enhance the effectiveness of potential conjunctive use programs by reducing flows to groundwater to _____ acre feet per year during periods of shortage; and increasing flows to groundwater to _____ acre feet per year during periods of excess.
65 [27, 35, 48, 54, 73]	ERPP/ Cooperatively manage _____ acres of ag lands and restore _____ acres of seasonal, semipermanent, and Core: permanent wetlands consistent with the CV Habitat Jt Venture and N. Am. Waterfowl Mgmt. Plan.

**Table A.7.3. Quantified Targeted Benefit Change, Sub-Region 7,  
Lower Sacramento River below Verona**

TB # (1) [duplicate]	Reference Condition		Quantified Targeted Benefit		Quantified Targeted Benefit Change			Specific Time-Frame (11)
	Data Source (8)	Availability (9)	Data Source (8)	Data Availability (9)	Data Source (8)	Availability (9)	Range of Values (10)	
55	CVGSM	Unproven-precise	ERPP	Rough estimate	Calculated	Rough estimate	95.3 TAF/yr	Year round
56	CVGSM	Unproven-precise	ERPP	Rough estimate	Calculated	Rough estimate	85.6 - 205 TAF/yr	flow event Oct 1-14 Oct 15 - June July - Sept
57 [6, 13, 20, 30, 75]	CVGSM	Unproven-precise	ERPP	Rough estimate	Calculated	Rough estimate	44 - 180 TAF/yr	Year round Fall
58	TBD	TBD	TBD	Proven - precise	Calculated	TBD	TBD	TBD
59 [52]	TBD	TBD	TBD	Proven - precise	Calculated	TBD	TBD	TBD
60	TBD	TBD	TBD	Proven - precise	Calculated	TBD	TBD	TBD
61	TBD	TBD	ERPP	Rough estimate	Calculated	TBD	TBD	Year round
62	TBD	TBD	ERPP	Not available	Not available	Not available	Not available	Not available
63	CVGSM	Unproven-precise	Core	Rough estimate	Calculated	Rough estimate	<1 TAF/yr	TBD
64	CVGSM	Unproven-precise	Core	Rough estimate	Calculated	Rough estimate	TBD	TBD
65 [27, 35, 48, 54, 73]	ERPP	TBD	ERPP	TBD	Calculated	TBD	1 TAF/yr	TBD

**Table A.7.4. Quantifiable Objective, Sub-Region 7,  
Lower Sacramento River below Verona**

<b>TB # (1) [duplicate]</b>	<b>Achievable Agricultural Potential (12)</b>	<b>Quantifiable Objective (13)</b>
55	38.1 - 53.2 TAF per year	1.8 - 31.2 TAF per year
56	103.5 - 116.4 TAF per year	59.5 - 93.2 TAF per year
57 [6, 13, 20, 30, 75]	1,044 - 1,897 TAF per year	44 - 180 TAF per year
58	TBD	TBD
59 [52]	TBD	TBD
60	TBD	TBD
61	TBD	TBD
62	TBD	TBD
63	<1 TAF per year plus additional water generated through reduction in application through improved irrigation systems	<1 TAF per year plus additional water generated through reduction in application through improved irrigation systems
64	TBD	TBD
65 [27, 35, 48, 54, 73]	1 TAF per year	1 TAF per year

**Table A.7.5. Affected Flow Paths and Possible Actions, Sub-Region 7,  
Lower Sacramento River below Verona**

<b>TB # (1) [duplicate]</b>	<b>Affected Flow Paths (14)</b>	<b>Possible Actions (provided as examples; proposers are encouraged to consider local actions that are not listed) (15)</b>
55	Surface and Groundwater Return	Improve farm irrigation management (such as irrigation scheduling) and more uniform irrigation methods (such as shorter furrows, sprinkler, or drip). Reduction in operational spill through improved management, canal automation or regulatory storage. Reduction in canal seepage through canal lining or piping.
56	Surface and Groundwater Return	Improve farm irrigation management (such as irrigation scheduling) and more uniform irrigation methods (such as shorter furrows, sprinkler, or drip). Reduction in operational spill through improved management, canal automation or regulatory storage. Reduction in canal seepage through canal lining or piping.
57 [6, 13, 20, 30, 75]	Surface and Groundwater Return	Improve farm irrigation management (such as irrigation scheduling) and more uniform irrigation methods (such as shorter furrows, sprinkler, or drip). Reduction in operational spill through improved management, canal automation or regulatory storage. Reduction in canal seepage through canal lining or piping.
58	TBD	TBD
59 [52]	TBD	TBD
60	TBD	TBD
61	TBD	TBD
62	TBD	TBD
63	ETAW	Reduce ET flows using improved irrigation methods, such as drip irrigation, and planting densities.
64	TBD	TBD
65 [27, 35, 48, 54, 73]	Surface water return and Percolation to Groundwater:	Improve farm irrigation management (such as irrigation scheduling) and more uniform irrigation methods (such as shorter furrows, sprinkler, or drip). Reduction in operational spill through improved management, canal automation or regulatory storage. Reduction in canal seepage through canal lining or piping.

## Detail 55, Provide Flow to Improve Aquatic Ecosystem Conditions in the American River

### **Step 1. Quantified Targets**

#### A. Flow Target for American River

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	107.4	97.0	187.1	193.1	122.8	118.8	92.1	61.4	29.7	107.4	104.0	107.4	1328.1
2) Dry	107.4	97.0	187.1	193.1	122.8	118.8	92.1	61.4	29.7	107.4	104.0	107.4	1328.1
3) B Norm	153.5	138.6	273.2	287.1	184.1	178.2	153.5	122.8	89.1	122.8	148.5	153.5	2004.8
4) A Norm	153.5	138.6	273.2	287.1	184.1	178.2	153.5	122.8	89.1	122.8	148.5	153.5	2004.8
5) Wet	153.5	138.6	404.9	415.8	276.2	267.3	153.5	153.5	148.5	153.5	148.5	153.5	2567.1
Wtd Avg.	136.8	123.5	282.1	292.2	189.9	183.8	131.2	109.9	85.7	126.5	132.4	136.8	1930.7

### **Step 2. Reference Condition**

#### A. American River Flows

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	191.8	175.2	198.8	183.6	200.0	126.9	77.8	55.1	54.7	57.6	60.6	75.3	1457.3
2) Dry	121.0	190.9	213.8	271.7	289.2	171.6	109.8	86.8	64.1	56.1	72.1	129.8	1776.9
3) B Norm	183.4	268.9	275.1	389.5	406.6	235.6	121.4	83.6	61.3	66.8	88.7	151.7	2332.4
4) A Norm	372.0	359.3	532.4	401.6	431.2	233.4	118.3	76.8	75.4	61.9	186.2	210.9	3059.4
5) Wet	512.3	396.7	411.5	449.2	459.7	330.8	182.3	138.9	124.8	102.2	150.8	332.6	3591.7
Wtd Avg.	294.7	289.3	326.0	355.1	371.8	235.3	131.1	96.6	82.2	73.2	112.8	199.4	2567.5

#### B. American River Riparian

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	3.7	3.1	3.6	4.1	5.3	6.0	6.7	6.3	5.7	4.9	4.4	3.7	57.4
2) Dry	3.6	2.8	3.3	3.9	5.3	5.9	6.6	6.4	5.8	4.8	4.4	3.6	56.3
3) B Norm	3.5	2.7	3.7	4.2	5.6	6.0	6.3	6.2	5.6	5.5	4.6	3.6	57.6
4) A Norm	3.4	2.9	3.3	3.9	5.3	5.9	6.4	6.2	5.4	4.6	4.1	3.4	55.0
5) Wet	3.1	2.7	3.4	3.7	5.4	6.3	7.1	7.0	6.1	4.7	3.7	3.1	56.4
Wtd Avg.	3.4	2.8	3.4	3.9	5.4	6.1	6.7	6.5	5.8	4.9	4.2	3.4	56.6

#### C. Carmichael WD

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.3	0.3	0.3	0.4	0.6	0.8	1.0	1.0	0.9	0.6	0.3	0.3	6.6
2) Dry	0.2	0.2	0.2	0.3	0.5	0.8	1.0	1.0	0.9	0.5	0.2	0.2	6.0
3) B Norm	0.1	0.1	0.1	0.3	0.5	0.9	1.0	1.0	0.8	0.5	0.3	0.2	5.8
4) A Norm	0.2	0.2	0.2	0.3	0.6	1.0	1.1	1.0	0.9	0.5	0.2	0.2	6.4
5) Wet	0.2	0.2	0.3	0.3	0.6	0.9	1.2	1.2	1.1	0.7	0.4	0.3	7.2
Wtd Avg.	0.2	0.2	0.2	0.3	0.6	0.9	1.1	1.1	0.9	0.6	0.3	0.2	6.5

D. Folsom S. Canal

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.6	0.2	0.5	0.4	0.8	1.3	1.5	1.0	0.8	0.8	0.5	0.9	9.3
2) Dry	0.3	0.0	0.1	0.2	0.6	0.8	0.8	0.6	0.6	0.7	0.4	0.7	5.5
3) B Norm	0.1	0.1	0.3	0.3	0.1	0.1	0.2	0.2	0.3	0.1	0.0	0.1	1.8
4) A Norm	0.2	0.1	0.1	0.2	0.4	0.7	0.8	0.7	0.5	0.4	0.3	0.5	4.8
5) Wet	0.3	0.0	0.1	0.2	0.6	0.7	0.6	0.5	0.5	0.5	0.3	0.6	5.0
Wtd Avg.	0.3	0.1	0.2	0.2	0.5	0.7	0.7	0.5	0.5	0.5	0.3	0.5	5.0

E. American R. Left Bank Div

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	1.2	1.1	0.9	1.1	1.3	1.7	1.9	1.8	1.4	1.1	1.0	1.3	15.9
2) Dry	0.5	0.5	0.6	0.9	1.2	1.2	1.5	1.5	1.2	0.8	0.5	0.5	10.8
3) B Norm	0.6	0.5	0.7	0.7	1.1	1.3	1.3	1.3	1.0	0.9	0.4	0.6	10.3
4) A Norm	0.7	0.8	0.9	1.1	1.3	1.4	1.7	1.7	1.2	0.6	0.4	0.4	12.2
5) Wet	1.0	1.0	1.0	1.3	2.0	2.1	2.5	2.4	2.1	1.4	1.0	1.0	18.8
Wtd Avg.	0.8	0.8	0.8	1.0	1.4	1.6	1.8	1.8	1.5	1.0	0.7	0.8	14.0

F. Reference Condition for American River

source: calculated = Step 2A. - Step 2B. - Step 2C. - Step 2D. - Step 2E.

Thousand Acre Feet

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	186.0	170.5	193.6	177.5	191.8	117.2	66.8	45.0	46.0	50.1	54.3	69.1	1368.0
2) Dry	116.4	187.5	209.7	266.5	281.6	163.0	99.8	77.2	55.7	49.4	66.7	124.8	1698.4
3) B Norm	179.1	265.5	270.2	383.9	399.3	227.3	112.6	75.0	53.5	59.8	83.4	147.4	2257.0
4) A Norm	367.5	355.4	527.9	396.2	423.5	224.4	108.2	67.2	67.4	55.8	181.1	206.4	2980.9
5) Wet	507.6	392.8	406.8	443.7	451.1	320.8	170.9	127.8	115.0	94.9	145.4	327.6	3504.3
Wtd Avg.	290.0	285.5	321.4	349.6	363.9	226.1	120.8	86.6	73.5	66.3	107.3	194.5	2485.5

**Step 3. Quantified Targeted Benefit Change**

A. Quantified Targeted Benefit Change

source: calculated: = Step 1A. - Step 2F.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.0	0.0	0.0	15.5	0.0	1.6	25.3	16.4	0.0	57.3	49.7	38.3	204.0
2) Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.0	37.2	0.0	95.3
3) B Norm	0.0	0.0	3.0	0.0	0.0	0.0	40.8	47.8	35.6	63.0	65.1	6.1	261.4
4) A Norm	0.0	0.0	0.0	0.0	0.0	0.0	45.3	55.5	21.7	67.0	0.0	0.0	189.5
5) Wet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.7	33.5	58.6	3.1	0.0	120.9
Wtd Avg.	0.0	0.0	0.6	2.0	0.0	0.2	17.5	26.9	20.3	60.3	29.3	6.2	163.2

**Step 4. Area Affected By Targeted Benefit**

A. Total Diversion Sub-Region 7

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	9.8	8.0	11.2	30.0	48.8	52.4	57.5	51.7	31.8	18.4	12.1	10.5	342.3
2) Dry	9.5	8.3	10.3	30.1	52.7	58.8	65.3	62.0	38.9	17.4	11.0	9.7	373.9
3) B Norm	9.4	8.3	11.1	26.0	49.8	55.9	63.2	60.4	39.2	19.7	12.0	9.9	365.0
4) A Norm	9.5	9.7	11.2	20.6	53.0	59.9	66.1	62.7	39.4	16.1	10.9	9.8	368.8
5) Wet	10.0	8.6	11.9	24.3	58.1	64.9	74.0	70.6	44.0	20.0	11.8	10.7	408.8
Wtd Avg.	9.6	8.5	11.2	26.3	53.3	59.4	66.6	63.0	39.7	18.6	11.6	10.2	377.9

B. Sub-Region 7 Streamflow Diversion Ratio

source: calculated = Step 2B./Step 4A.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1) Critical	0.40	0.42	0.34	0.15	0.12	0.13	0.13	0.14	0.21	0.30	0.39	0.37
2) Dry	0.39	0.35	0.34	0.14	0.11	0.11	0.12	0.12	0.17	0.30	0.41	0.39
3) B Norm	0.39	0.34	0.35	0.17	0.12	0.12	0.12	0.12	0.17	0.30	0.40	0.38
4) A Norm	0.38	0.32	0.31	0.20	0.11	0.11	0.11	0.12	0.16	0.32	0.40	0.37
5) Wet	0.34	0.33	0.31	0.16	0.10	0.11	0.11	0.12	0.16	0.27	0.34	0.32
Wtd Avg.	0.37	0.35	0.33	0.16	0.11	0.12	0.12	0.12	0.17	0.29	0.39	0.36

C. Total Diversion Sub-Region 8

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	3.4	2.9	5.8	13.9	20.4	23.7	24.0	20.9	14.2	11.3	5.0	4.5	150.0
2) Dry	2.9	2.6	4.6	13.2	21.7	27.2	28.4	25.5	18.1	11.0	5.2	3.8	164.2
3) B Norm	2.6	2.6	5.5	14.4	25.5	32.4	32.8	28.3	19.8	13.1	4.6	3.4	185.1
4) A Norm	2.8	2.6	3.5	11.5	22.6	31.9	32.3	28.6	18.0	10.8	5.0	3.1	172.5
5) Wet	3.2	2.7	5.1	11.4	26.3	34.8	38.2	34.7	22.7	13.7	4.9	3.7	201.5
Wtd Avg.	3.0	2.7	5.0	12.8	23.8	30.7	32.2	28.7	19.3	12.2	4.9	3.7	179.0

D. Sub-Region 8 Streamflow Diversion Ratio

source: calculated = Step 2B./Step 4C.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1) Critical	0.54	0.46	0.23	0.11	0.11	0.12	0.14	0.13	0.16	0.17	0.31	0.49
2) Dry	0.28	0.19	0.14	0.08	0.08	0.07	0.08	0.08	0.10	0.13	0.17	0.32
3) B Norm	0.26	0.25	0.18	0.07	0.04	0.04	0.04	0.05	0.06	0.07	0.10	0.19
4) A Norm	0.32	0.33	0.28	0.11	0.08	0.07	0.08	0.08	0.09	0.09	0.14	0.30
5) Wet	0.41	0.37	0.21	0.13	0.10	0.08	0.08	0.08	0.11	0.14	0.27	0.44
Wtd Avg.	0.36	0.31	0.20	0.10	0.08	0.07	0.08	0.08	0.10	0.12	0.20	0.35

**Step 5. Water Balance - Flow Path Elements**

A. Rain Sub-Region 7 & 8 (inflow)

source: CVGSM Sub-Region 7 & 8 \* Step 4.

Flow Path Not Affected

Thousand Acre Feet

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	34.1	24.1	8.2	2.5	2.1	0.9	0.1	0.4	0.9	5.0	12.6	25.4	116.2
2) Dry	23.4	18.0	13.8	3.1	1.4	0.2	0.0	0.1	1.1	3.6	12.3	25.8	103.1
3) B Norm	24.6	27.5	15.2	4.3	0.8	0.2	0.0	0.0	0.9	3.3	10.3	19.0	106.0
4) A Norm	45.7	39.8	25.6	5.1	1.5	0.1	0.1	0.1	0.7	5.1	14.2	25.3	163.4
5) Wet	50.1	37.1	24.9	10.0	1.2	0.5	0.1	0.2	1.1	6.8	28.1	55.2	215.6
Wtd Avg.	36.1	29.4	18.3	5.6	1.3	0.4	0.1	0.1	1.0	4.9	17.0	33.3	147.5

B. Surface Water Diversions Sub-Region 7 & 8 (inflow)

source: CVGSM Sub-Region 7 & 8 \* Step 4.

Flow Path Not Affected

Thousand Acre Feet

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.8	1.0	1.6	1.5	1.9	2.5	2.8	2.7	2.4	1.6	1.2	0.9	21.1
2) Dry	0.7	0.6	1.0	1.4	1.8	2.2	2.5	2.3	2.1	1.6	1.2	0.9	18.4
3) B Norm	0.8	0.6	1.2	1.6	1.7	2.0	2.1	2.1	1.8	1.4	1.1	0.8	17.1
4) A Norm	0.7	0.6	0.9	2.0	1.8	2.2	2.5	2.3	2.1	1.3	1.1	0.8	18.3
5) Wet	0.7	0.6	1.0	1.7	1.9	2.3	2.5	2.4	2.3	1.4	1.1	0.8	18.7
Wtd Avg.	0.7	0.7	1.1	1.6	1.8	2.2	2.5	2.4	2.2	1.5	1.1	0.8	18.6

C. Import Sub-Region 7 & 8 (inflow)

source: CVGSM Sub-Region 7 & 8 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.7	1.2	2.7	8.8	6.8	9.3	10.4	8.8	5.7	3.2	1.2	1.2	60.0
2) Dry	0.6	0.5	1.2	6.8	7.0	8.7	9.7	8.0	4.4	3.2	1.1	1.0	52.1
3) B Norm	0.6	0.5	1.7	7.4	7.1	8.8	8.9	7.7	4.0	2.4	0.9	0.8	50.8
4) A Norm	0.6	0.5	1.1	9.0	7.1	9.4	10.2	8.9	4.9	1.9	1.0	0.9	55.6
5) Wet	0.6	0.5	1.2	5.8	7.5	9.3	10.1	8.8	5.5	2.5	1.0	1.2	54.1
Wtd Avg.	0.6	0.6	1.5	7.2	7.1	9.1	9.8	8.4	4.9	2.7	1.0	1.0	53.9

D. Groundwater Pumping Sub-Region 7 & 8 (inflow)

source: CVGSM Sub-Region 7 & 8 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.9	1.5	8.6	21.4	19.6	29.4	37.3	27.1	14.5	4.0	1.2	1.1	166.6
2) Dry	0.9	0.7	1.5	10.9	14.5	18.6	22.1	16.7	8.4	3.5	1.2	1.0	100.1
3) B Norm	0.9	0.7	1.8	11.1	10.4	14.3	14.9	11.5	5.6	2.5	1.1	0.9	75.8
4) A Norm	0.9	0.6	1.1	13.2	12.8	17.4	20.5	15.6	7.8	2.3	1.1	1.0	94.2
5) Wet	0.8	0.7	1.3	9.7	14.2	19.0	21.2	15.8	8.8	2.6	1.0	1.0	96.0
Wtd Avg.	0.8	0.8	2.4	12.2	14.0	19.1	22.2	16.6	8.7	2.9	1.1	1.0	101.8

E. ET Rain Sub-Region 7 & 8 (outflow, irrecoverable)

source: CVGSM Sub-Region 7 & 8 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	10.2	14.4	7.4	-1.1	1.5	0.7	0.1	0.3	4.1	7.5	8.0	8.4	61.4
2) Dry	6.8	8.6	9.6	0.4	0.4	0.2	0.0	0.1	3.9	6.0	5.2	6.4	47.5
3) B Norm	6.4	9.8	10.6	0.8	0.2	0.2	0.0	0.0	4.2	5.0	3.7	4.5	45.3
4) A Norm	7.4	11.9	15.7	1.6	0.4	0.1	0.1	0.1	4.0	7.2	4.4	6.0	59.0
5) Wet	9.1	13.3	12.2	4.8	-0.4	0.3	0.1	0.2	4.4	7.9	8.2	9.1	69.1
Wtd Avg.	7.9	11.5	11.1	1.8	0.3	0.3	0.1	0.1	4.1	6.7	6.0	7.1	56.9

F. Runoff from Rain Sub-Region 7 & 8 (outflow, irrecoverable)

source: CVGSM Sub-Region 7 & 8 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	14.3	9.7	2.4	0.7	0.7	0.2	0.0	0.1	0.2	1.3	3.6	9.2	42.4
2) Dry	10.6	9.5	6.8	1.0	0.3	0.0	0.0	0.0	0.4	0.9	3.6	10.2	43.5
3) B Norm	12.1	16.3	7.6	1.7	0.2	0.0	0.0	0.0	0.3	0.7	2.1	7.6	48.6
4) A Norm	27.9	24.2	13.4	1.7	0.5	0.0	0.0	0.0	0.2	0.9	3.8	11.6	84.1
5) Wet	34.1	23.3	14.2	4.7	0.3	0.1	0.0	0.0	0.3	2.0	11.1	32.5	122.6
Wtd Avg.	20.8	17.0	9.5	2.3	0.4	0.1	0.0	0.0	0.3	1.2	5.6	16.5	73.8

G. ETAW Sub-Region 7 & 8 (outflow, irrecoverable)

source: CVGSM Sub-Region 7 & 8 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.0	1.5	7.3	12.9	14.5	24.1	31.3	25.1	17.1	6.9	1.2	0.8	142.5
2) Dry	0.0	0.0	1.3	8.8	12.9	16.6	20.7	17.3	11.0	6.4	0.8	0.5	96.4
3) B Norm	0.0	0.0	2.1	9.1	10.3	13.6	15.1	13.4	7.9	4.5	0.4	0.3	76.8
4) A Norm	0.0	0.0	0.9	11.8	12.6	16.1	20.0	17.1	10.3	3.3	0.7	0.3	93.2
5) Wet	0.0	0.0	1.2	8.5	14.9	17.5	20.6	17.3	11.7	4.4	0.5	0.2	96.8
Wtd Avg.	0.0	0.2	2.2	9.7	13.1	17.2	20.8	17.5	11.3	5.1	0.7	0.4	98.1

H. Export Sub-Region 7 & 8 (outflow, irrecoverable)

source: CVGSM Sub-Region 7 & 8 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	2.0	2.1	2.1	1.1	1.1	1.5	1.7	1.8	2.3	2.2	2.5	1.9	22.2
2) Dry	2.0	1.8	2.1	1.0	1.0	1.3	1.6	1.6	2.0	2.3	2.6	2.0	21.3
3) B Norm	1.9	1.7	2.2	1.3	1.2	1.5	1.5	1.5	2.0	2.3	2.6	1.9	21.5
4) A Norm	1.9	1.5	2.0	1.5	1.1	1.4	1.5	1.5	1.9	2.3	2.5	1.8	20.8
5) Wet	1.7	1.7	2.0	1.2	1.0	1.3	1.5	1.5	2.0	2.0	2.2	1.6	19.5
Wtd Avg.	1.9	1.7	2.1	1.2	1.1	1.4	1.5	1.6	2.0	2.2	2.4	1.8	20.9

I. Surface Water Return Sub-Region 7 & 8 (outflow, recoverable)

source: CVGSM Sub-Region 7 & 8 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.0	0.0	2.9	13.8	9.5	12.4	15.1	10.1	3.8	0.5	0.1	0.0	68.5
2) Dry	0.0	0.0	0.1	5.8	6.5	8.7	9.3	6.4	2.2	0.5	0.1	0.0	39.8
3) B Norm	0.0	0.0	0.2	5.6	4.9	6.9	6.4	4.3	1.5	0.4	0.1	0.0	30.3
4) A Norm	0.0	0.0	0.0	5.4	5.2	8.5	8.6	5.7	2.3	0.3	0.1	0.0	36.1
5) Wet	0.0	0.0	0.1	3.4	5.0	8.6	9.0	5.9	2.6	0.4	0.0	0.0	35.2
Wtd Avg.	0.0	0.0	0.5	6.0	6.0	8.8	9.3	6.2	2.4	0.4	0.1	0.0	39.7

J. Groundwater Return Sub-Region 7 & 8 (outflow, recoverable)

source: CVGSM Sub-Region 7 & 8 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	3.6	1.1	1.1	4.8	3.3	4.1	4.1	3.5	0.8	0.2	0.6	2.2	29.4
2) Dry	2.4	1.2	0.3	3.8	3.0	3.1	3.2	2.6	0.6	0.1	1.3	2.7	24.3
3) B Norm	2.9	2.3	0.4	4.2	2.8	3.2	2.8	2.2	0.4	0.2	1.5	2.2	25.0
4) A Norm	6.4	3.8	0.8	5.5	2.9	3.0	3.1	2.3	0.5	0.4	2.0	2.6	33.2
5) Wet	6.9	3.4	0.9	4.0	2.7	3.3	3.0	2.4	0.6	0.3	3.2	7.0	37.8
Wtd Avg.	4.5	2.4	0.7	4.3	2.9	3.3	3.2	2.6	0.6	0.2	1.9	3.8	30.4

K. Evaporation Flows Sub-Region 7 & 8 (outflow, irrecoverable)

source: = 0.02 \* (Step 5B + 5C - 5H)

= 0.02 \* (Surface Water Diversions + Import - Export)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	-0.2	-0.2	-0.1	0.2	0.1	0.2	0.3	0.2	0.1	-0.1	-0.1	-0.1	0.4
2) Dry	-0.1	-0.1	-0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.0	-0.1	-0.1	0.5
3) B Norm	-0.1	-0.2	-0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	-0.1	0.5
4) A Norm	-0.1	-0.2	-0.3	0.2	0.2	0.2	0.3	0.2	0.1	-0.1	0.0	-0.1	0.3
5) Wet	-0.2	-0.2	-0.2	0.1	0.2	0.2	0.3	0.2	0.1	-0.1	-0.1	-0.1	0.1
Wtd Avg.	-0.1	-0.2	-0.2	0.1	0.2	0.2	0.2	0.2	0.1	-0.1	-0.1	-0.1	0.3

## L. Sub-Region Water Balance 7 & 8

source: = Step 5.(A + B + C + D) - Step5. (E + F + G + H + I + J + K)  
= (Rain + Surface Water Diversions + Import + Groundwater Pumping) - (ET Rain +  
Runoff from Rain + ETAW + Export + Surface & Groundwater Return + Evaporation)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	3.5	-0.4	-0.5	0.2	0.0	-0.1	-0.3	-0.3	-0.8	-0.8	0.2	3.0	3.7
2) Dry	1.1	-0.2	-0.4	0.1	0.0	0.0	-0.1	-0.1	-0.4	-0.5	0.4	2.2	2.2
3) B Norm	0.9	-0.2	-0.6	0.1	0.0	0.0	0.0	0.0	-0.3	-0.3	0.3	1.0	1.0
4) A Norm	1.4	0.1	-1.1	0.2	0.0	0.0	0.0	0.0	-0.3	-0.3	0.6	1.6	2.2
5) Wet	0.2	-0.9	-0.4	0.1	0.1	0.0	0.0	0.0	-0.4	-0.5	1.6	3.4	3.2
Wtd Avg.	1.1	-0.4	-0.5	0.1	0.0	0.0	-0.1	-0.1	-0.4	-0.5	0.8	2.4	2.4

## M. Applied Water Ratio Sub-Region 7 & 8

source: = Step 5G / Step 5 (B + C+ D - H)  
= ETAW/(Surfce Water Diversions + Import + Groundwater Pumping - Export)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.00	0.91	0.67	0.42	0.53	0.61	0.64	0.68	0.84	1.05	0.99	0.64	0.63
2) Dry	0.00	0.77	0.86	0.49	0.58	0.59	0.63	0.68	0.86	1.06	0.92	0.57	0.65
3) B Norm	0.00	0.40	0.87	0.48	0.57	0.57	0.62	0.68	0.84	1.11	0.81	0.45	0.63
4) A Norm	0.00	0.00	0.73	0.52	0.61	0.58	0.63	0.68	0.80	1.02	0.89	0.39	0.63
5) Wet	0.00	0.00	0.75	0.53	0.66	0.60	0.63	0.68	0.79	0.98	0.61	0.15	0.65
Wtd Avg.	0.0	0.4	0.8	0.5	0.6	0.6	0.6	0.7	0.8	1.0	0.8	0.4	0.6

## N. Groundwater Check Sub-Region 7 & 8

source: = Step 5 (J - D)  
= Groundwater Return Flows - Groundwater Pumping

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	2.7	-0.4	-7.5	-16.7	-16.3	-25.3	-33.3	-23.6	-13.7	-3.8	-0.6	1.2	-137.2
2) Dry	1.5	0.5	-1.2	-7.1	-11.5	-15.5	-19.0	-14.1	-7.8	-3.4	0.1	1.7	-75.8
3) B Norm	2.0	1.7	-1.4	-7.0	-7.6	-11.2	-12.1	-9.3	-5.2	-2.3	0.4	1.3	-50.8
4) A Norm	5.6	3.1	-0.3	-7.7	-9.9	-14.4	-17.5	-13.3	-7.3	-1.9	0.8	1.7	-61.0
5) Wet	6.1	2.7	-0.4	-5.7	-11.5	-15.7	-18.2	-13.4	-8.2	-2.3	2.3	6.1	-58.2
Wtd Avg.	3.7	1.6	-1.7	-8.0	-11.1	-15.8	-19.0	-14.0	-8.1	-2.7	0.8	2.9	-71.5

## Step 6. Idealized Agricultural Potential

### A. Export Adjustment

92% of Export (Step 5H.) water is available for flow/timing changes in Sub-Region 7

0% of Export (Step 5H.) water is available for flow/timing changes in Sub-Region 8

note: Import (Step 5C) and Export (Step 5H) are in the water balance. In this Step (7D) Export water is considered water that flows through districts in Sub-Regions 4, 5, and 7. This water is available to make flow/timing changes

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	3.8	2.0	2.0	2.7	3.1	3.3	4.3	4.1	---	---	25.3
2) Dry	---	---	4.0	1.9	1.9	2.5	2.9	2.9	3.7	4.2	---	---	23.9
3) B Norm	---	---	4.1	2.4	2.2	2.7	2.8	2.8	3.6	4.2	---	---	24.7
4) A Norm	---	---	3.7	2.8	1.9	2.5	2.8	2.8	3.5	4.2	---	---	24.2
5) Wet	---	---	3.6	2.2	1.8	2.4	2.7	2.8	3.6	3.7	---	---	22.8
Wtd Avg.	---	---	3.8	2.2	1.9	2.5	2.9	2.9	3.7	4.0	---	---	24.0

## B. Idealized Agricultural Potential

source: = Step 5 ((B + C + D) + Step 6A. - Step 5 (G + H))  
= (Surface Water Diversions + Import + Groundwater Diversions) - (ETAW + Export  
+ Export Adjustment)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	7.3	19.8	14.7	18.4	20.7	15.0	7.5	3.7	---	---	107.2
2) Dry	---	---	4.2	11.2	11.3	14.0	14.9	11.0	5.6	3.8	---	---	76.0
3) B Norm	---	---	4.4	12.1	9.9	12.8	12.1	9.2	5.1	3.7	---	---	69.4
4) A Norm	---	---	4.0	13.6	10.0	14.0	14.4	10.9	6.1	4.1	---	---	77.2
5) Wet	---	---	4.0	9.6	9.5	14.2	14.6	11.0	6.6	3.8	---	---	73.2
Wtd Avg.	---	---	4.6	12.3	10.7	14.4	14.9	11.2	6.1	3.8	---	---	78.0

## Step 7. Achievable Agricultural Potential

### A. Farm Demand

assumes farm loss fraction of 0.14 for Sub-Region 7, and 0.13 for Sub-Region 8, values vary by SubRegion  
source: = ETAW / Farm High (1- loss fraction)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	8.4	14.9	16.8	27.8	36.1	28.9	19.7	8.0	---	---	160.5
2) Dry	---	---	1.5	10.2	14.9	19.2	23.9	20.0	12.7	7.4	---	---	109.8
3) B Norm	---	---	2.4	10.5	11.9	15.7	17.5	15.5	9.2	5.3	---	---	87.9
4) A Norm	---	---	1.0	13.6	14.5	18.7	23.2	19.8	11.9	3.8	---	---	106.5
5) Wet	---	---	1.4	9.8	17.2	20.2	23.7	20.0	13.5	5.1	---	---	110.9
Wtd Avg.	---	---	2.5	11.2	15.2	19.9	24.0	20.2	13.0	5.9	---	---	111.9

### B. Groundwater Pumping after System Improvements

Existing Farm Efficiency for Sub-Region 7 = 0.7

source: = (1 - 0.7 \* (1/0.7-1/(1-Farm Loss Fraction))) \* Groundwater Pumping

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	7.0	17.4	15.9	23.9	30.4	22.1	11.8	3.2	---	---	131.7
2) Dry	---	---	1.2	8.9	11.8	15.2	18.0	13.6	6.8	2.9	---	---	78.4
3) B Norm	---	---	1.5	9.1	8.5	11.7	12.1	9.4	4.6	2.0	---	---	58.8
4) A Norm	---	---	0.9	10.7	10.4	14.2	16.7	12.7	6.3	1.9	---	---	73.8
5) Wet	---	---	1.1	7.9	11.5	15.4	17.3	12.9	7.2	2.1	---	---	75.4
Wtd Avg.	---	---	1.9	10.0	11.4	15.6	18.0	13.5	7.1	2.4	---	---	79.9

### C. Farm Demand not met by Groundwater Pumping

source: = Step 7.A - Step 7.B  
= Farm Demand - Groundwater Pumping

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	1.4	-2.6	0.9	3.9	5.7	6.9	7.9	4.7	---	---	28.8
2) Dry	---	---	0.3	1.3	3.0	4.0	5.9	6.4	5.9	4.5	---	---	31.4
3) B Norm	---	---	1.0	1.5	3.4	4.1	5.4	6.1	4.6	3.2	---	---	29.1
4) A Norm	---	---	0.1	2.9	4.1	4.5	6.5	7.1	5.5	1.9	---	---	32.7
5) Wet	---	---	0.3	2.0	5.7	4.7	6.4	7.2	6.3	2.9	---	---	35.5
Wtd Avg.	---	---	0.6	1.2	3.8	4.3	6.0	6.7	6.0	3.5	---	---	32.0

D. Water Supplier Delivery to Meet Farm Demand

assumes district loss fraction of 0.08

source: = Step 7C / District High (1- loss fraction)

= Farm Demand not met by Groundwater Pumping/(1 - 0.08)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	1.5	-2.8	0.9	4.2	6.2	7.5	8.6	5.2	---	---	31.3
2) Dry	---	---	0.4	1.4	3.3	4.4	6.4	6.9	6.4	4.9	---	---	34.1
3) B Norm	---	---	1.0	1.6	3.7	4.4	5.8	6.6	5.0	3.5	---	---	31.7
4) A Norm	---	---	0.1	3.2	4.5	4.9	7.0	7.7	6.0	2.1	---	---	35.5
5) Wet	---	---	0.3	2.1	6.2	5.2	7.0	7.8	6.8	3.2	---	---	38.6
Wtd Avg.	---	---	0.6	1.4	4.1	4.7	6.5	7.3	6.5	3.8	---	---	34.8

E. Achievable Agricultural Potential

source = Step 5.(B + C - H) + Step 6A - Step 7D.

= Surface Water Diversions + Import - Export + Export Adjustment - Water Supplier  
Delivery to Meet Farm Demand

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	4.5	14.1	8.7	8.9	8.5	5.5	1.5	1.5	---	---	53.2
2) Dry	---	---	3.7	7.6	6.4	7.6	7.1	4.7	1.8	1.8	---	---	40.6
3) B Norm	---	---	3.6	8.5	6.1	7.6	6.5	4.5	2.4	2.3	---	---	41.5
4) A Norm	---	---	3.7	9.0	5.3	7.9	7.0	4.8	2.6	3.0	---	---	43.2
5) Wet	---	---	3.5	6.3	4.0	7.5	6.9	4.8	2.6	2.4	---	---	38.1
Wtd Avg.	---	---	3.7	8.4	5.8	7.8	7.1	4.8	2.3	2.2	---	---	42.0

F. Groundwater Check after System Improvements

source =  $(0.14 * 0.80 * \text{ETAW}) + (0.13 * 0.80 * \text{ETAW}) + (0.04 * (\text{Farm Demand w/o Groundwater} - \text{Water Supplier Delivery})) - \text{Groundwater Pumping}$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	-7.1	-16.5	-15.8	-26.8	-34.7	-24.7	-13.0	-3.5	---	---	-142.0
2) Dry	---	---	-1.2	-8.5	-11.4	-16.6	-19.9	-15.1	-7.5	-3.2	---	---	-83.4
3) B Norm	---	---	-1.5	-8.7	-6.8	-12.1	-13.2	-10.2	-5.0	-2.3	---	---	-59.7
4) A Norm	---	---	-1.0	-10.4	-8.4	-14.4	-18.4	-14.0	-7.0	-2.1	---	---	-75.6
5) Wet	---	---	-1.1	-7.4	-10.4	-16.1	-18.8	-14.1	-8.0	-2.4	---	---	-78.2
Wtd Avg.	---	---	-2.0	-9.5	-10.3	-16.6	-20.0	-14.9	-7.8	-2.6	---	---	-83.6

**Step 8. Quantifiable Objective**

A. Quantifiable Objective

source = minimum (Step 3A., Step 7E.)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	0.0	14.1	0.0	1.6	8.5	5.5	0.0	1.5	---	---	31.2
2) Dry	---	---	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	---	---	1.8
3) B Norm	---	---	3.0	0.0	0.0	0.0	6.5	4.5	2.4	2.3	---	---	18.7
4) A Norm	---	---	0.0	0.0	0.0	0.0	7.0	4.8	2.6	3.0	---	---	17.3
5) Wet	---	---	0.0	0.0	0.0	0.0	0.0	4.8	2.6	2.4	---	---	9.8
Wtd Avg.	---	---	0.6	1.8	0.0	0.2	3.3	3.7	1.6	2.2	---	---	13.5

## Detail 56, Provide Flow to Improve Aquatic Ecosystem Conditions in the Bear River

### **Step 1. Quantified Targets**

#### A. Flow Target for Bear River

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	15.3	13.9	24.6	14.9	15.3	14.9	0.6	0.6	0.6	11.2	14.9	15.3	142.0
2) Dry	15.3	13.9	24.6	14.9	15.3	14.9	0.6	0.6	0.6	11.2	14.9	15.3	142.0
3) B Norm	15.3	13.9	15.3	14.9	15.3	14.9	0.6	0.6	0.6	11.2	14.9	15.3	132.8
4) A Norm	15.3	13.9	15.3	14.9	15.3	14.9	0.6	0.6	0.6	11.2	14.9	15.3	132.8
5) Wet	15.3	13.9	15.3	14.9	15.3	14.9	0.6	0.6	0.6	11.2	14.9	15.3	132.8
Wtd Avg.	15.3	13.9	18.7	14.9	15.3	14.9	0.6	0.6	0.6	11.2	14.9	15.3	136.1

### **Step 2. Reference Condition**

#### A. Bear River Flows

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	8.3	12.7	10.2	6.8	5.0	3.8	3.5	2.8	2.6	4.9	5.7	9.0	75.1
2) Dry	13.9	34.6	42.0	26.5	12.3	5.8	4.1	4.3	2.0	2.6	4.7	14.0	166.8
3) B Norm	30.5	67.0	53.2	48.7	22.0	12.9	9.4	8.2	4.2	3.4	6.2	21.2	286.9
4) A Norm	68.7	96.7	94.5	51.5	28.3	13.4	11.9	11.1	6.3	3.2	16.9	24.6	427.0
5) Wet	99.8	107.8	92.8	81.0	34.7	16.0	13.0	12.1	6.3	6.2	15.8	63.9	549.3
Wtd Avg.	49.8	68.7	62.4	48.3	22.2	11.1	8.8	8.2	4.4	4.2	10.1	31.4	329.6

#### B. Camp Far West ID Diversion

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.0	0.1	0.2	2.3	2.2	1.1	0.8	0.6	0.0	0.2	0.0	0.0	7.6
2) Dry	0.0	0.0	0.0	2.2	2.0	1.6	1.2	0.6	0.3	0.3	0.0	0.0	8.1
3) B Norm	0.0	0.0	0.0	2.5	2.1	1.7	1.1	0.4	0.3	0.1	0.0	0.0	8.3
4) A Norm	0.0	0.0	0.0	2.0	1.9	1.9	1.4	0.6	0.3	0.1	0.0	0.0	8.2
5) Wet	0.0	0.0	0.0	1.4	1.6	1.6	1.4	0.7	0.4	0.3	0.0	0.2	7.7
Wtd Avg.	0.0	0.0	0.0	2.0	1.9	1.6	1.2	0.6	0.3	0.2	0.0	0.1	8.0

#### C. Boardman Canal

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	1.0	1.0	0.9	0.8	1.1	0.9	0.9	0.9	0.7	1.0	1.0	1.1	11.3
2) Dry	0.8	0.9	1.0	1.1	1.1	0.9	1.0	1.0	0.7	0.6	0.7	0.8	10.6
3) B Norm	0.9	0.9	1.0	1.0	1.1	1.2	0.9	1.0	0.9	0.9	0.8	1.0	11.7
4) A Norm	0.9	0.9	0.9	0.8	1.1	1.0	1.2	1.2	1.0	0.8	0.9	0.8	11.4
5) Wet	0.9	0.8	0.9	0.7	0.9	0.9	1.0	1.1	0.9	0.6	0.8	1.0	10.4
Wtd Avg.	0.9	0.8	0.9	0.9	1.0	1.0	1.0	1.0	0.8	0.8	0.8	1.0	11.0

#### D. Bear River Canal

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	4.0	2.9	4.3	5.9	10.5	12.7	14.8	13.9	11.0	7.8	5.1	4.5	97.3
2) Dry	4.2	3.7	4.5	7.0	11.4	15.4	18.1	17.6	14.7	7.9	4.7	4.1	113.4
3) B Norm	3.9	3.6	4.7	5.6	11.9	15.4	18.2	18.1	14.9	8.7	4.9	4.3	114.0
4) A Norm	4.1	5.0	5.9	4.6	10.7	14.6	17.1	16.6	13.2	6.7	4.5	4.1	106.9
5) Wet	4.5	3.9	5.9	6.3	10.7	15.2	18.1	17.9	14.7	8.8	5.4	5.0	116.5
Wtd Avg.	4.2	3.8	5.1	6.0	11.1	14.9	17.6	17.2	14.0	8.2	5.0	4.5	111.5

E. Combie Canal

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.8	0.7	0.7	1.9	2.8	2.1	2.7	2.9	2.7	2.4	1.2	1.0	21.9
2) Dry	0.8	0.7	0.9	2.3	4.2	3.2	3.8	3.8	3.3	2.1	1.0	0.9	27.0
3) B Norm	0.9	0.9	0.9	2.0	3.6	3.6	3.6	3.5	3.3	2.8	1.3	0.9	27.4
4) A Norm	0.9	0.8	0.9	2.2	4.1	3.8	4.0	4.1	3.5	2.1	1.1	0.9	28.3
5) Wet	1.2	1.0	1.4	2.5	4.6	4.3	4.9	4.6	4.2	2.9	1.5	1.2	34.2
Wtd Avg.	0.9	0.8	1.0	2.2	4.0	3.6	4.0	3.9	3.5	2.5	1.2	1.0	28.8

F. Reference Condition for Bear River

source: calculated = Step 2A. - Step 2B. - Step 2C. - Step 2D. - Step 2E.

Thousand Acre Feet

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	2.4	8.0	4.1	-4.1	-11.6	-13.0	-15.8	-15.4	-11.8	-6.5	-1.7	2.4	-63.0
2) Dry	8.1	29.2	35.6	14.0	-6.3	-15.4	-20.0	-18.6	-16.9	-8.3	-1.7	8.1	7.7
3) B Norm	24.8	61.6	46.5	37.7	3.1	-9.1	-14.4	-14.9	-15.2	-9.0	-0.7	15.0	125.5
4) A Norm	62.9	90.1	86.9	41.9	10.5	-7.8	-11.8	-11.4	-11.7	-6.6	10.4	18.8	272.2
5) Wet	93.2	102.1	84.6	70.1	16.9	-6.0	-12.4	-12.2	-13.9	-6.5	8.1	56.5	380.5
Wtd Avg.	43.8	63.2	55.3	37.1	4.2	-10.0	-14.9	-14.6	-14.3	-7.4	3.1	24.9	170.3

**Step 3. Quantified Targeted Benefit Change**

A. Quantified Targeted Benefit Change

source: calculated: = Step 1A. - Step 2F.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	12.9	5.8	20.5	19.0	27.0	27.9	16.4	16.0	12.3	17.7	16.5	13.0	205.0
2) Dry	7.3	0.0	0.0	0.9	21.7	30.3	20.6	19.2	17.5	19.5	16.6	7.2	160.7
3) B Norm	0.0	0.0	0.0	0.0	12.2	23.9	15.1	15.5	15.8	20.2	15.6	0.3	118.5
4) A Norm	0.0	0.0	0.0	0.0	4.9	22.7	12.4	12.0	12.3	17.7	4.5	0.0	86.4
5) Wet	0.0	0.0	0.0	0.0	0.0	20.9	13.0	12.9	14.5	17.7	6.7	0.0	85.6
Wtd Avg.	3.4	0.8	2.7	2.7	11.7	24.8	15.5	15.2	14.9	18.6	11.8	3.4	125.4

**Step 4. Area Affected By Targeted Benefit**

A. Total Diversion Sub-Region 5

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	5.9	8.2	14.4	80.4	152.3	144.4	157.0	137.6	67.2	44.9	22.7	16.2	851.3
2) Dry	5.5	3.6	8.7	83.6	165.6	164.9	176.4	158.2	82.3	52.2	22.9	15.5	939.4
3) B Norm	7.1	3.6	10.9	75.2	158.0	165.5	172.7	155.0	91.9	55.1	23.8	16.0	934.6
4) A Norm	4.6	3.5	5.6	53.9	164.2	171.3	181.4	162.8	87.9	44.7	16.4	10.7	907.0
5) Wet	5.4	2.9	8.3	59.3	174.1	179.1	198.0	181.3	99.0	56.3	24.5	14.5	1002.7
Wtd Avg.	5.7	4.0	9.4	70.2	164.7	167.5	180.3	162.5	88.1	52.1	22.7	14.7	942.0

B. Sub-Region 5 Streamflow Diversion Ratio

source: calculated = Step 2B./Step 4A.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1) Critical	0.00	0.01	0.02	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
2) Dry	0.00	0.00	0.00	0.03	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.00
3) B Norm	0.00	0.00	0.00	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
4) A Norm	0.00	0.00	0.00	0.04	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
5) Wet	0.00	0.00	0.00	0.02	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.01
Wtd Avg.	0.00	0.00	0.00	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00

C. Total Diversion Sub-Region 7

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	9.8	8.0	11.2	30.0	48.8	52.4	57.5	51.7	31.8	18.4	12.1	10.5	342.3
2) Dry	9.5	8.3	10.3	30.1	52.7	58.8	65.3	62.0	38.9	17.4	11.0	9.7	373.9
3) B Norm	9.4	8.3	11.1	26.0	49.8	55.9	63.2	60.4	39.2	19.7	12.0	9.9	365.0
4) A Norm	9.5	9.7	11.2	20.6	53.0	59.9	66.1	62.7	39.4	16.1	10.9	9.8	368.8
5) Wet	10.0	8.6	11.9	24.3	58.1	64.9	74.0	70.6	44.0	20.0	11.8	10.7	408.8
Wtd Avg.	9.6	8.5	11.2	26.3	53.3	59.4	66.6	63.0	39.7	18.6	11.6	10.2	377.9

B. Sub-Region 7 Streamflow Diversion Ratio

source: calculated = (Step 2B. + Step 2C. + Step 2D.)/Step 4C.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1) Critical	0.60	0.58	0.53	0.29	0.29	0.30	0.32	0.34	0.45	0.61	0.61	0.63
2) Dry	0.61	0.65	0.62	0.34	0.32	0.33	0.35	0.36	0.48	0.61	0.58	0.61
3) B Norm	0.61	0.64	0.59	0.33	0.33	0.36	0.36	0.37	0.49	0.63	0.58	0.62
4) A Norm	0.62	0.68	0.69	0.37	0.30	0.32	0.34	0.35	0.45	0.60	0.60	0.58
5) Wet	0.66	0.66	0.69	0.39	0.28	0.31	0.32	0.33	0.45	0.62	0.65	0.67
Wtd Avg.	0.63	0.65	0.63	0.35	0.30	0.33	0.34	0.35	0.46	0.61	0.61	0.63

**Step 5. Water Balance - Flow Path Elements**

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A. Rain Sub-Region 5 & 7 (inflow)

source: CVGSM Sub-Region 5 & 7 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	11.0	8.9	4.4	2.0	2.0	0.6	0.0	0.2	0.5	3.8	5.8	10.1	49.2
2) Dry	11.8	12.9	11.8	3.9	1.5	0.3	0.0	0.1	1.4	3.3	8.5	13.0	68.5
3) B Norm	13.7	18.0	10.3	5.3	1.2	0.5	0.1	0.1	1.1	3.9	8.5	13.0	75.6
4) A Norm	23.4	25.5	14.8	4.9	1.4	0.1	0.1	0.1	1.1	5.8	10.6	11.6	99.2
5) Wet	25.6	19.2	18.3	8.9	1.0	0.7	0.1	0.2	0.9	7.6	17.6	27.3	127.4
Wtd Avg.	17.8	17.0	12.9	5.6	1.3	0.5	0.1	0.1	1.0	5.1	11.2	16.8	89.3

B. Surface Water Diversions Sub-Region 5 & 7 (inflow)

source: CVGSM Sub-Region 5 & 7 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	1.0	1.2	2.0	8.4	5.4	5.2	5.3	4.8	3.4	2.5	1.5	1.1	41.8
2) Dry	1.1	1.1	1.7	7.7	5.9	6.7	6.5	5.3	3.9	2.7	1.4	1.1	45.2
3) B Norm	1.1	1.1	1.6	8.7	6.6	7.2	6.7	5.4	4.0	2.5	1.4	1.1	47.6
4) A Norm	1.0	1.1	1.6	9.8	5.7	7.0	6.7	5.2	3.8	2.0	1.4	1.0	46.4
5) Wet	1.2	1.1	1.8	6.4	5.0	6.3	6.3	5.1	3.9	2.3	1.5	1.2	42.1
Wtd Avg.	1.1	1.1	1.7	7.9	5.7	6.5	6.4	5.2	3.9	2.4	1.5	1.1	44.4

C. Import Sub-Region 5 & 7 (inflow)

source: CVGSM Sub-Region 5 & 7 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.7	0.8	2.0	14.7	11.4	13.9	15.2	12.6	5.9	3.0	1.1	0.8	82.0
2) Dry	0.7	0.7	1.4	14.9	14.6	19.0	20.4	16.3	6.5	3.6	1.1	0.8	99.9
3) B Norm	0.8	0.7	1.6	12.8	16.4	21.6	22.4	19.1	7.4	3.3	1.1	0.8	107.9
4) A Norm	0.7	0.7	1.1	14.4	13.9	19.9	20.8	18.2	7.3	2.0	1.1	0.7	100.9
5) Wet	0.8	0.7	1.3	10.6	13.4	18.4	19.7	16.9	7.4	2.5	1.1	0.9	93.6
Wtd Avg.	0.8	0.7	1.4	13.1	14.1	18.8	19.9	16.8	7.0	2.9	1.1	0.8	97.4

D. Groundwater Pumping Sub-Region 5 & 7 (inflow)

source: CVGSM Sub-Region 5 & 7 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	1.2	1.5	3.3	21.2	16.0	22.3	23.7	17.7	4.8	2.8	1.7	1.3	117.7
2) Dry	1.2	1.2	1.9	18.1	15.2	22.4	22.0	15.6	4.7	2.8	1.6	1.3	108.1
3) B Norm	1.3	1.2	1.7	16.7	15.5	23.1	21.0	14.0	4.0	2.8	1.6	1.3	104.1
4) A Norm	1.3	1.2	1.9	18.0	13.7	20.7	19.8	12.7	3.5	2.6	1.6	1.2	98.2
5) Wet	1.3	1.2	2.1	17.5	12.5	20.2	19.3	12.5	3.4	2.6	1.8	1.4	95.7
Wtd Avg.	1.3	1.2	2.1	18.0	14.3	21.6	20.9	14.2	4.0	2.7	1.7	1.3	103.5

E. ET Rain Sub-Region 5 & 7 (outflow, irrecoverable)

source: CVGSM Sub-Region 5 & 7 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	2.8	5.2	5.1	-1.7	1.2	0.4	0.0	0.2	7.9	5.8	2.1	2.4	31.5
2) Dry	3.2	6.3	8.7	-0.5	1.0	0.3	0.0	0.2	9.8	5.6	2.0	2.6	39.4
3) B Norm	3.4	6.4	8.1	0.1	0.9	0.4	0.1	0.1	11.4	6.3	2.0	2.7	41.7
4) A Norm	3.3	6.7	10.6	0.3	0.9	0.0	0.1	0.1	10.4	8.1	1.6	2.4	44.6
5) Wet	4.1	6.7	10.1	2.3	0.6	0.5	0.1	0.3	10.7	8.4	3.2	4.1	51.2
Wtd Avg.	3.5	6.3	8.8	0.4	0.9	0.4	0.1	0.2	10.2	7.0	2.4	3.0	43.1

F. Runoff from Rain Sub-Region 5 & 7 (outflow, irrecoverable)

source: CVGSM Sub-Region 5 & 7 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	2.9	3.1	1.1	0.4	0.7	0.1	0.0	0.0	0.1	0.2	0.6	2.4	11.7
2) Dry	3.8	6.3	5.6	1.1	0.4	0.0	0.0	0.0	0.5	0.3	1.1	2.9	22.4
3) B Norm	4.8	10.1	5.0	1.9	0.3	0.0	0.0	0.0	0.4	0.3	0.5	2.8	26.2
4) A Norm	11.1	15.0	7.6	1.6	0.5	0.0	0.0	0.0	0.3	0.2	0.9	3.4	40.6
5) Wet	15.8	11.8	10.3	4.0	0.2	0.1	0.0	0.0	0.2	1.1	2.5	10.9	57.0
Wtd Avg.	8.5	9.5	6.6	2.1	0.4	0.1	0.0	0.0	0.3	0.5	1.3	5.3	34.7

G. ETAW Sub-Region 5 & 7 (outflow, irrecoverable)

source: CVGSM Sub-Region 5 & 7 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.0	0.5	3.6	13.5	16.5	21.1	23.6	20.7	11.1	5.1	0.4	0.0	116.2
2) Dry	0.0	0.0	0.8	13.8	17.3	23.9	26.1	21.8	10.9	5.9	0.4	0.0	121.0
3) B Norm	0.0	0.0	0.9	13.4	18.7	25.9	26.6	22.5	9.7	5.2	0.2	0.0	123.2
4) A Norm	0.0	0.0	0.1	15.1	16.5	23.7	25.4	21.1	9.1	2.8	0.4	0.0	114.2
5) Wet	0.0	0.0	0.6	12.2	15.3	22.3	24.3	20.2	8.9	3.2	0.0	0.0	106.9
Wtd Avg.	0.0	0.1	1.0	13.4	16.7	23.4	25.2	21.2	9.8	4.4	0.2	0.0	115.6

H. Export Sub-Region 5 & 7 (outflow, irrecoverable)

source: CVGSM Sub-Region 5 & 7 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Thousands Acre Feet
1) Critical	3.0	2.9	3.2	2.7	2.9	3.5	4.2	4.3	5.2	4.5	3.8	3.1	43.3
2) Dry	3.0	3.2	4.0	3.0	3.2	4.1	4.8	4.7	5.7	4.5	3.7	3.0	47.0
3) B Norm	3.1	3.2	3.8	3.0	3.4	4.5	4.9	4.9	5.8	4.7	3.7	3.1	48.2
4) A Norm	3.0	3.3	4.4	3.4	3.0	4.1	4.7	4.6	5.4	4.3	3.7	2.8	46.6
5) Wet	3.3	3.3	4.4	3.2	2.8	3.9	4.5	4.4	5.4	4.6	4.1	3.4	47.3
Wtd Avg.	3.1	3.2	4.0	3.1	3.1	4.1	4.6	4.6	5.5	4.5	3.9	3.1	46.8

I. Surface Water Return Sub-Region 5 & 7 (outflow, recoverable)

source: CVGSM Sub-Region 5 & 7 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.1	0.1	0.4	18.9	6.8	10.8	12.6	8.2	1.0	0.5	0.1	0.1	59.5
2) Dry	0.1	0.1	0.2	13.6	7.7	12.4	11.3	6.8	1.0	0.5	0.1	0.1	53.8
3) B Norm	0.1	0.1	0.2	11.3	8.2	12.3	10.2	5.3	0.9	0.5	0.1	0.1	49.2
4) A Norm	0.1	0.1	0.1	11.0	6.5	11.8	9.5	4.6	0.9	0.3	0.1	0.1	44.9
5) Wet	0.1	0.1	0.1	8.2	6.5	10.7	9.5	4.6	0.9	0.3	0.1	0.1	41.1
Wtd Avg.	0.1	0.1	0.2	11.8	7.2	11.6	10.5	5.7	1.0	0.4	0.1	0.1	48.6

J. Groundwater Return Sub-Region 5 & 7 (outflow, recoverable)

source: CVGSM Sub-Region 5 & 7 \* Step 4.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	1.7	0.4	0.7	10.7	7.4	7.8	7.7	6.9	0.1	0.4	0.8	1.5	46.0
2) Dry	1.4	0.8	0.2	10.9	8.0	8.4	8.1	6.7	0.1	0.3	1.5	2.1	48.5
3) B Norm	1.6	1.6	0.2	10.2	8.0	9.1	8.1	6.4	0.2	0.3	2.0	2.0	49.6
4) A Norm	4.8	2.6	0.2	12.5	7.1	7.9	7.7	5.9	0.2	0.8	2.6	1.3	53.5
5) Wet	4.9	2.0	0.4	10.7	6.3	8.2	7.4	5.9	0.2	0.8	3.9	5.3	56.0
Wtd Avg.	3.0	1.5	0.3	10.9	7.3	8.3	7.8	6.3	0.1	0.5	2.4	2.9	51.3

K. Evaporation Flows Sub-Region 5 & 7 (outflow, irrecoverable)

source: = 0.02 \* (Step 5B + 5C - 5H)

= 0.02 \* (Surface Water Diversions + Import - Export)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.8
2) Dry	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.9
3) B Norm	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	1.0
4) A Norm	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.9
5) Wet	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.8
Wtd Avg.	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.9

L. Sub-Region Water Balance 5 & 7

source: = Step 5.(A + B + C + D) - Step5. (E + F + G + H + I + J + K)

= (Rain + Surface Water Diversions + Import + Groundwater Pumping) - (ET Rain +

Runoff from Rain + ETAW + Export + Surface & Groundwater Return + Evaporation)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	2.1	0.1	-1.4	0.5	-0.2	-0.5	-1.3	-1.8	-4.9	-2.8	1.4	2.4	-6.4
2) Dry	2.0	-0.5	-1.7	0.8	-0.2	-0.3	-0.5	-1.1	-5.6	-2.9	2.2	3.2	-4.6
3) B Norm	2.5	-0.3	-1.8	1.1	0.0	0.0	0.0	-0.3	-5.7	-3.1	2.4	3.5	-1.7
4) A Norm	2.5	0.6	-2.5	1.1	0.0	0.0	0.0	-0.1	-4.7	-2.5	3.2	2.6	0.4
5) Wet	0.4	-1.1	-1.6	1.0	0.0	-0.1	-0.2	-0.3	-4.8	-2.1	5.2	4.8	1.1
Wtd Avg.	1.7	-0.4	-1.8	0.9	-0.1	-0.2	-0.3	-0.6	-5.2	-2.6	3.2	3.6	-1.9

### M. Applied Water Ratio Sub-Region 5 & 7

source: = Step 5G / Step 5 (B + C + D - H)

= ETAW/(Surface Water Diversions + Import + Groundwater Pumping - Export)

	Thousand Acre Feet												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.00	0.88	0.90	0.32	0.55	0.56	0.59	0.67	1.25	1.37	0.85	0.00	0.59
2) Dry	0.00	-0.26	0.82	0.37	0.53	0.54	0.59	0.67	1.16	1.31	0.88	0.00	0.59
3) B Norm	0.00	0.00	0.83	0.38	0.53	0.55	0.59	0.67	1.00	1.33	0.65	0.00	0.58
4) A Norm	0.00	0.00	0.29	0.39	0.55	0.55	0.59	0.67	0.97	1.20	0.97	0.00	0.57
5) Wet	0.00	0.00	0.72	0.39	0.55	0.55	0.59	0.67	0.95	1.13	0.00	0.04	0.58
Wtd Avg.	0.0	0.1	0.7	0.4	0.5	0.5	0.6	0.7	1.1	1.3	0.6	0.0	0.6

### N. Groundwater Check Sub-Region 5 & 7

source: = Step 5 (J - D)

= Groundwater Return Flows - Groundwater Pumping

	Thousand Acre Feet												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.5	-1.1	-2.5	-10.6	-8.7	-14.6	-16.0	-10.8	-4.7	-2.4	-1.0	0.2	-71.6
2) Dry	0.1	-0.5	-1.7	-7.2	-7.2	-14.0	-13.9	-8.9	-4.6	-2.5	-0.1	0.8	-59.6
3) B Norm	0.2	0.4	-1.5	-6.4	-7.5	-14.0	-12.9	-7.6	-3.9	-2.4	0.4	0.7	-54.6
4) A Norm	3.6	1.3	-1.7	-5.5	-6.6	-12.8	-12.1	-6.8	-3.3	-1.8	1.0	0.0	-44.7
5) Wet	3.6	0.9	-1.7	-6.8	-6.2	-11.9	-11.8	-6.6	-3.3	-1.9	2.2	3.9	-39.7
Wtd Avg.	1.7	0.3	-1.8	-7.1	-7.1	-13.3	-13.1	-7.9	-3.9	-2.2	0.7	1.5	-52.1

### **Step 6. Idealized Agricultural Potential**

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#### A. Export Adjustment

92% of Export (Step 5H.) water is available for flow/timing changes in Sub-Region 5

92% of Export (Step 5H.) water is available for flow/timing changes in Sub-Region 7

note: Import (Step 5C) and Export (Step 5H) are in the water balance. In this Step (7D) Export water is considered water that flows through districts in Sub-Regions 4, 5, and 7. This water is available to make flow/timing changes

	Thousand Acre Feet												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	5.9	4.9	5.3	6.5	7.7	7.9	9.5	8.3	---	---	56.0
2) Dry	---	---	7.3	5.6	5.9	7.6	8.8	8.7	10.5	8.3	---	---	62.6
3) B Norm	---	---	7.0	5.5	6.3	8.3	9.1	9.1	10.7	8.6	---	---	64.5
4) A Norm	---	---	8.0	6.2	5.6	7.5	8.6	8.5	9.8	7.9	---	---	62.2
5) Wet	---	---	8.1	5.8	5.2	7.2	8.2	8.1	9.9	8.5	---	---	61.0
Wtd Avg.	---	---	7.4	5.6	5.6	7.5	8.5	8.5	10.1	8.4	---	---	61.6

#### B. Idealized Agricultural Potential

source: = Step 5 ((B + C + D) + Step 6A. - Step 5 (G + H))

= Surface Water Diversions + Import + Groundwater Diversions) - (ETAW + Export  
+ Export Adjustment)

	Thousand Acre Feet												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	6.3	33.0	18.8	23.3	24.1	18.1	7.3	6.9	---	---	137.8
2) Dry	---	---	7.5	29.5	21.1	27.6	26.8	19.3	9.0	6.9	---	---	147.8
3) B Norm	---	---	7.2	27.3	22.7	29.9	27.6	20.1	10.7	7.3	---	---	152.6
4) A Norm	---	---	8.2	29.9	19.4	27.3	25.9	18.8	10.1	7.4	---	---	147.0
5) Wet	---	---	8.3	24.9	17.9	25.8	24.8	18.0	10.4	8.1	---	---	138.2
Wtd Avg.	---	---	7.6	28.1	19.9	26.9	25.9	18.9	9.7	7.4	---	---	144.4

## **Step 7. Achievable Agricultural Potential**

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### A. Farm Demand

assumes farm loss fraction of 0.22 for Sub-Region 5, and 0.14 for Sub-Region 7, values vary by SubRegion  
 source: = ETAW / Farm High (1- loss fraction)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Thousand Acre Feet Total
1) Critical	---	---	4.2	16.1	19.4	24.7	27.6	24.2	12.9	6.0	---	---	135.1
2) Dry	---	---	1.0	16.4	20.3	28.1	30.5	25.5	12.7	6.9	---	---	141.4
3) B Norm	---	---	1.1	15.9	22.0	30.3	31.1	26.3	11.3	6.1	---	---	144.1
4) A Norm	---	---	0.1	17.9	19.4	27.9	29.7	24.6	10.6	3.2	---	---	133.5
5) Wet	---	---	0.7	14.4	17.9	26.2	28.4	23.6	10.4	3.7	---	---	125.3
Wtd Avg.	---	---	1.2	15.9	19.7	27.5	29.5	24.8	11.5	5.2	---	---	135.2

### B. Groundwater Pumping after System Improvements

Existing Farm Efficiency for Sub-Region 5 = 0.7

source: =  $(1 - 0.7 * (1/0.7 - 1/(1 - \text{Farm Loss Fraction}))) * \text{Groundwater Pumping}$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Thousand Acre Feet Total
1) Critical	---	---	2.9	19.0	14.4	20.0	21.3	15.9	4.3	2.5	---	---	100.4
2) Dry	---	---	1.7	16.3	13.7	20.1	19.7	14.0	4.2	2.5	---	---	92.2
3) B Norm	---	---	1.5	14.9	13.9	20.7	18.9	12.5	3.6	2.5	---	---	88.6
4) A Norm	---	---	1.7	16.1	12.3	18.6	17.8	11.4	3.1	2.3	---	---	83.4
5) Wet	---	---	1.9	15.7	11.2	18.1	17.3	11.2	3.1	2.4	---	---	80.8
Wtd Avg.	---	---	1.9	16.2	12.9	19.4	18.8	12.8	3.6	2.4	---	---	87.9

### C. Farm Demand not met by Groundwater Pumping

source: = Step 7.A - Step 7.B

= Farm Demand - Groundwater Pumping

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Thousand Acre Feet Total
1) Critical	---	---	1.3	-3.0	5.0	4.7	6.3	8.3	8.6	3.5	---	---	34.7
2) Dry	---	---	-0.8	0.1	6.7	8.0	10.8	11.4	8.5	4.4	---	---	49.1
3) B Norm	---	---	-0.4	1.0	8.1	9.6	12.3	13.7	7.7	3.6	---	---	55.6
4) A Norm	---	---	-1.6	1.8	7.1	9.3	12.0	13.3	7.5	0.9	---	---	50.2
5) Wet	---	---	-1.2	-1.3	6.7	8.1	11.1	12.4	7.3	1.4	---	---	44.5
Wtd Avg.	---	---	-0.7	-0.3	6.8	8.1	10.8	12.0	7.8	2.7	---	---	47.3

### D. Water Supplier Delivery to Meet Farm Demand

assumes district loss fraction of 0.08

source: = Step 7C / District High (1- loss fraction)

= Farm Demand not met by Groundwater Pumping/(1 - 0.08)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Thousand Acre Feet Total
1) Critical	---	---	1.4	-3.2	5.4	5.1	6.8	9.0	9.4	3.8	---	---	37.7
2) Dry	---	---	-0.8	0.1	7.2	8.7	11.7	12.4	9.2	4.8	---	---	53.4
3) B Norm	---	---	-0.5	1.1	8.8	10.4	13.4	14.9	8.3	3.9	---	---	60.4
4) A Norm	---	---	-1.8	2.0	7.7	10.1	13.0	14.4	8.1	1.0	---	---	54.5
5) Wet	---	---	-1.3	-1.4	7.3	8.8	12.1	13.4	7.9	1.5	---	---	48.4
Wtd Avg.	---	---	-0.7	-0.3	7.4	8.8	11.7	13.1	8.5	3.0	---	---	51.4

#### E. Achievable Agricultural Potential

source = Step 5.(B + C - H) + Step 6A - Step 7D.

= Surface Water Diversions + Import - Export + Export Adjustment - Water Supplier Delivery to Meet Farm Demand

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	5.3	28.5	13.8	17.0	17.1	12.1	4.2	5.4	---	---	103.5
2) Dry	---	---	7.2	25.0	15.9	20.5	19.2	13.1	6.0	5.3	---	---	112.2
3) B Norm	---	---	6.9	22.9	17.1	22.2	19.8	13.7	7.9	5.8	---	---	116.4
4) A Norm	---	---	8.1	25.0	14.4	20.2	18.5	12.9	7.6	6.6	---	---	113.4
5) Wet	---	---	8.1	21.0	13.3	19.2	17.7	12.3	7.9	7.2	---	---	106.6
Wtd Avg.	---	---	7.3	23.8	14.9	19.9	18.5	12.8	6.9	6.2	---	---	110.4

#### F. Groundwater Check after System Improvements

source =  $(0.22 * 0.80 * \text{ETAW}) + (0.14 * 0.80 * \text{ETAW}) + (0.04 * (\text{Farm Demand w/o Groundwater} - \text{Water Supplier Delivery})) - \text{Groundwater Pumping}$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	-2.8	-18.6	-12.8	-19.1	-20.8	-15.5	-3.8	-2.5	---	---	-96.0
2) Dry	---	---	-1.8	-15.7	-11.8	-18.9	-19.1	-13.1	-3.7	-2.4	---	---	-86.6
3) B Norm	---	---	-1.6	-14.4	-12.2	-19.5	-17.9	-11.3	-3.1	-2.4	---	---	-82.3
4) A Norm	---	---	-1.9	-15.5	-10.0	-16.5	-17.0	-10.2	-2.6	-2.4	---	---	-76.3
5) Wet	---	---	-2.0	-15.5	-8.6	-16.5	-16.8	-10.2	-2.6	-2.4	---	---	-74.6
Wtd Avg.	---	---	-2.0	-15.7	-10.8	-18.0	-18.1	-11.8	-3.1	-2.4	---	---	-82.0

#### Step 8. Quantifiable Objective

##### A. Quantifiable Objective

source = minimum (Step 3A. , Step 7E.)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	5.3	19.0	13.8	17.0	16.4	12.1	4.2	5.4	---	---	93.2
2) Dry	---	---	0.0	0.9	15.9	20.5	19.2	13.1	6.0	5.3	---	---	80.8
3) B Norm	---	---	0.0	0.0	12.2	22.2	15.1	13.7	7.9	5.8	---	---	77.0
4) A Norm	---	---	0.0	0.0	4.9	20.2	12.4	12.0	7.6	6.6	---	---	63.7
5) Wet	---	---	0.0	0.0	0.0	19.2	13.0	12.3	7.9	7.2	---	---	59.5
Wtd Avg.	---	---	0.7	2.7	8.6	19.9	15.2	12.7	6.9	6.2	---	---	72.9

## Detail 63, Decrease Nonproductive ET, SubRegion 7

### Step 1. Quantified Targets

#### A. Acreage Assumed for Reduction of Nonproductive ET

source: CVGSM Sub-Region 7

Crop	Potential for ET Red.	Existing	Assumed for ET Reduction*	
			acres	percent
Pasture	No	15,900	0	0%
Alfalfa	No	3,400	0	0%
Sugar Beet	No	3,400	0	0%
Field	No	5,100	0	0%
Rice	No	56,500	0	0%
Truck	Yes	400	120	30%
Tomato	Yes	1,200	360	30%
Orchard	Yes	8,900	2,670	30%
Grains	No	15,200	0	0%
Vineyard	Yes	200	60	30%
Cotton	No	0	0	0%
Citrus and Olives	Yes	0	0	0%
Total		110,200	3,210	3%

\*The Assumed  
Acreage for ET  
Reduction is 30% of  
the crops that have the  
Potential for ET  
Reduction.

#### B. Existing ET for Sub-Region 7

source: CVGSM

Crop	Inches												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Pasture	---	---	---	---	---	---	---	---	---	---	---	---	---
Alfalfa	---	---	---	---	---	---	---	---	---	---	---	---	---
Sugar Beet	---	---	---	---	---	---	---	---	---	---	---	---	---
Field	---	---	---	---	---	---	---	---	---	---	---	---	---
Rice	---	---	---	---	---	---	---	---	---	---	---	---	---
Truck	0.00	0.00	0.00	2.20	1.00	2.00	3.70	6.60	4.60	1.20	0.00	0.00	21.30
Tomato	0.00	0.00	0.00	2.20	3.20	6.90	8.50	5.40	2.70	0.00	0.00	0.00	28.90
Orchard	1.00	1.80	3.00	3.10	4.80	6.40	7.40	6.30	4.70	2.70	1.60	1.00	43.80
Grains	---	---	---	---	---	---	---	---	---	---	---	---	---
Vineyard	0.00	0.00	0.00	2.24	3.40	5.60	6.70	5.50	3.70	1.40	0.00	0.00	28.54
Cotton	---	---	---	---	---	---	---	---	---	---	---	---	---
Citrus and Olives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---
Total	0.83	1.50	2.50	2.95	4.45	6.28	7.37	6.20	4.45	2.32	1.33	0.83	41.00

#### C. ET from Rain for Sub-Region 7

source: CVGSM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.51	0.89	0.93	0.00	0.34	0.13	0.00	0.04	1.91	1.02	0.38	0.41	6.58
2) Dry	0.58	1.07	1.53	0.00	0.29	0.08	0.00	0.04	2.22	0.96	0.38	0.47	7.62
3) B Norm	0.60	1.08	1.49	0.00	0.23	0.09	0.02	0.01	2.54	1.09	0.37	0.46	7.98
4) A Norm	0.58	1.07	1.68	0.00	0.27	0.00	0.02	0.03	2.52	1.47	0.30	0.46	8.39
5) Wet	0.68	1.10	1.59	0.49	0.20	0.16	0.03	0.08	2.58	1.43	0.54	0.62	9.50
Wtd Avg.	0.61	1.06	1.48	0.15	0.25	0.10	0.02	0.05	2.39	1.20	0.42	0.51	8.23

#### D. Existing ETAW for Sub-Region 7

	source: calculated = Step 1B.(Average Total) - Step 1C., (set to 0 if Step 1B. - Step 1C. <0)												Inches
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.32	0.61	1.56	2.95	4.11	6.14	7.37	6.15	2.54	1.29	0.95	0.42	34.42
2) Dry	0.25	0.43	0.97	2.95	4.16	6.20	7.37	6.16	2.23	1.35	0.95	0.36	33.38
3) B Norm	0.23	0.42	1.01	2.95	4.22	6.18	7.35	6.18	1.92	1.23	0.96	0.37	33.02
4) A Norm	0.25	0.43	0.82	2.95	4.19	6.28	7.35	6.16	1.93	0.85	1.03	0.38	32.61
5) Wet	0.15	0.40	0.90	2.46	4.26	6.12	7.34	6.11	1.87	0.89	0.79	0.21	31.50
Wtd Avg.	0.23	0.44	1.02	2.80	4.20	6.17	7.36	6.15	2.06	1.11	0.91	0.32	32.77

#### E. Target ETAW for Sub-Region 7

	source: calculated = Step 1D. * 90%												Inches
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.29	0.55	1.41	2.65	3.70	5.53	6.63	5.54	2.29	1.17	0.86	0.38	30.98
2) Dry	0.23	0.39	0.87	2.65	3.74	5.58	6.63	5.54	2.01	1.22	0.85	0.32	30.04
3) B Norm	0.21	0.38	0.91	2.65	3.80	5.57	6.62	5.56	1.73	1.11	0.86	0.33	29.72
4) A Norm	0.23	0.39	0.74	2.65	3.77	5.65	6.61	5.55	1.74	0.77	0.93	0.34	29.35
5) Wet	0.14	0.36	0.81	2.21	3.83	5.51	6.61	5.50	1.69	0.80	0.71	0.19	28.35
Wtd Avg.	0.20	0.40	0.91	2.52	3.78	5.56	6.62	5.53	1.85	1.00	0.82	0.29	29.49

#### **Step 2. Reference Condition**

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For ET Reduction the Reference Condition is the existing Crop ET, Step 1B.

#### **Step 3. Quantified Targeted Benefit Change**

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##### A. Quantified Targeted Benefit Change for Sub-Region 7

	source: calculated = Step 1D - Step 1E												Inches
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	---	---	0.41	0.61	0.74	0.62	---	---	---	---	2.38
2) Dry	---	---	---	---	0.42	0.62	0.74	0.62	---	---	---	---	2.39
3) B Norm	---	---	---	---	0.42	0.62	0.74	0.62	---	---	---	---	2.39
4) A Norm	---	---	---	---	0.42	0.63	0.73	0.62	---	---	---	---	2.40
5) Wet	---	---	---	---	0.43	0.61	0.73	0.61	---	---	---	---	2.38
Wtd Avg.	---	---	---	---	0.42	0.62	0.74	0.61	---	---	---	---	2.39

##### B. Quantified Targeted Benefit Change for Sub-Region 7

	source: calculated = Step 1D - Step 1E												Thousand Acre Feet
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	---	---	0.11	0.16	0.20	0.16	---	---	---	---	0.6
2) Dry	---	---	---	---	0.11	0.17	0.20	0.16	---	---	---	---	0.6
3) B Norm	---	---	---	---	0.11	0.17	0.20	0.17	---	---	---	---	0.6
4) A Norm	---	---	---	---	0.11	0.17	0.20	0.16	---	---	---	---	0.6
5) Wet	---	---	---	---	0.11	0.16	0.20	0.16	---	---	---	---	0.6
Wtd Avg.	---	---	---	---	0.11	0.17	0.20	0.16	---	---	---	---	0.6

#### **Step 4. Area Affected by Targeted Benefit**

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Area affected are the 3,210 acres identified in Step 1A.

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**Step 5. Water Flow Path Elements**

The flow path elements used in this analysis are given in Step 1.

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**Step 6. Idealized Agricultural Potential**

Additional ET research is required to determine this component.

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**Step 7. Achievable Agricultural Potential**

The farm Available Agricultural Potential is the same as Step 3B.

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**Step 8. Quantifiable Objective**

- A. For ET Reduction the Quantifiable Objective is Step 3B

**Detail 65, Provide long-term diversion flexibility to increase the water supply for beneficial uses.**

**Step 1. Quantified Targets**

A. Percentage of Subregion 7 in each Wetland Region

source: GIS analysis

Basin	Basin Acres	Sub-Region 7 Acres	Ratio Acreage in Sub-Region to Total Acreage
Colusa	1,100,765	1	--
Butte	574,618	1	--
Sutter	224,142	345	--
American	517,893	304,708	0.59
Yolo	514,963	78	--
Delta	1,332,584	2,171	--
Suisun	99,311	1	--
San Joaquin	1,877,034	1	--
Tulare	3,523,884	1	--

B. Annual Water Need for Optimum Habitat by Wetland Type

source: Central Valley Wetlands Water Supply Investigations (August, 2000)

Basin	Seasonal Wetlands	Semi-Permanent Wetlands	Permanent Wetlands	Annual Total
-----Acre Feet-----				
Colusa	43,435	7,563	6,771	57,769
Butte	72,923	11,337	10,150	94,410
Sutter	469	81	73	622
American	5,695	992	888	7,575
Yolo	25,755	4,484	4,015	34,254
Delta	10,053	1,843	1,650	13,546
Suisun	119,995	21,993	19,690	161,677
San Joaq.	188,480	20,663	15,856	225,000
Tulare	15,640	1,854	1,415	18,908

C. Fraction of Water Need Requirements by Month as a Percentage of Total Water Need- Seasonal Wetlands

source: Central Valley Wetlands Water Supply Investigations (August, 2000)

Basin	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Colusa	0.04	0.04	0.04	0.00	0.14	0.00	0.00	0.18	0.36	0.08	0.08	0.04	1.0
Butte	0.04	0.04	0.04	0.00	0.18	0.00	0.00	0.16	0.36	0.09	0.07	0.04	1.0
Sutter	0.04	0.04	0.04	0.00	0.14	0.00	0.00	0.18	0.36	0.08	0.08	0.04	1.0
American	0.04	0.04	0.04	0.00	0.14	0.00	0.00	0.18	0.36	0.08	0.08	0.04	1.0
Yolo	0.04	0.04	0.04	0.00	0.14	0.00	0.00	0.18	0.36	0.08	0.08	0.04	1.0
Delta	0.04	0.04	0.04	0.05	0.00	0.00	0.00	0.19	0.42	0.08	0.08	0.04	1.0
Suisun	0.04	0.04	0.04	0.05	0.00	0.00	0.00	0.19	0.42	0.08	0.08	0.04	1.0
San Joaq.	0.04	0.04	0.00	0.00	0.15	0.05	0.00	0.15	0.38	0.08	0.08	0.04	1.0
Tulare	0.04	0.04	0.00	0.15	0.00	0.11	0.00	0.09	0.38	0.08	0.08	0.04	1.0

**D. Fraction of Water Need Requirements by Month as a Percentage of Total Water Need- Semi-Permanent Wetlands**  
 source: Central Valley Wetlands Water Supply Investigations (August, 2000)

Basin	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Colusa	0.03	0.03	0.05	0.07	0.07	0.14	0.14	0.00	0.00	0.41	0.05	0.03	1.0
Butte	0.03	0.03	0.05	0.07	0.07	0.14	0.14	0.00	0.00	0.41	0.05	0.03	1.0
Sutter	0.03	0.03	0.05	0.07	0.07	0.14	0.14	0.00	0.00	0.41	0.05	0.03	1.0
American	0.03	0.03	0.05	0.07	0.07	0.14	0.14	0.00	0.00	0.41	0.05	0.03	1.0
Yolo	0.03	0.03	0.05	0.07	0.07	0.14	0.14	0.00	0.00	0.41	0.05	0.03	1.0
Delta	0.03	0.03	0.05	0.07	0.07	0.14	0.14	0.00	0.00	0.41	0.05	0.03	1.0
Suisun	0.03	0.03	0.05	0.07	0.07	0.14	0.14	0.00	0.00	0.41	0.05	0.03	1.0
San Joaq.	0.03	0.03	0.05	0.07	0.07	0.14	0.14	0.00	0.00	0.41	0.05	0.03	1.0
Tulare	0.03	0.04	0.06	0.08	0.08	0.13	0.13	0.00	0.00	0.38	0.06	0.04	1.0

**E. Fraction of Water Need Requirements by Month as a Percentage of Total Water Need- Permanent Wetlands**

source: Central Valley Wetlands Water Supply Investigations (August, 2000)

Basin	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Colusa	0.02	0.02	0.04	0.08	0.11	0.15	0.15	0.15	0.13	0.08	0.06	0.02	1.0
Butte	0.02	0.02	0.04	0.08	0.11	0.15	0.15	0.15	0.13	0.08	0.06	0.02	1.0
Sutter	0.02	0.02	0.04	0.08	0.11	0.15	0.15	0.15	0.13	0.08	0.06	0.02	1.0
American	0.02	0.02	0.04	0.08	0.11	0.15	0.15	0.15	0.13	0.08	0.06	0.02	1.0
Yolo	0.02	0.02	0.04	0.08	0.11	0.15	0.15	0.15	0.13	0.08	0.06	0.02	1.0
Delta	0.02	0.02	0.04	0.08	0.11	0.15	0.15	0.15	0.13	0.08	0.06	0.02	1.0
Suisun	0.02	0.02	0.04	0.08	0.11	0.15	0.15	0.15	0.13	0.08	0.06	0.02	1.0
San Joaq.	0.02	0.02	0.04	0.08	0.11	0.15	0.15	0.15	0.13	0.08	0.06	0.02	1.0
Tulare	0.02	0.02	0.04	0.08	0.11	0.15	0.15	0.15	0.13	0.08	0.06	0.02	1.0

**F. Target Water Application for Private Wetlands in Sub-Region 7**

source: calculated using Step1A through Step 1E

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Thousands Acre Feet
Seasonal	0.1	0.1	0.1	-	0.5	-	-	0.6	1.2	0.3	0.3	0.1	3.4
Semi-Perman	0.0	0.0	0.0	0.0	0.0	0.1	0.1	-	-	0.2	0.0	0.0	0.6
Permanent	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.5
Total	0.2	0.2	0.2	0.1	0.6	0.2	0.2	0.7	1.3	0.5	0.3	0.2	4.5

**Step 2. Reference Condition**

**A. Annual Available Water Supply by Wetland Type**

source: Central Valley Wetlands Water Supply Investigations

Basin	Wetlands		Wetlands Acre Feet	Permanent Wetlands	Total
	---	---			
Colusa	36,601		6,625	6,101	49,327
Butte	57,797		9,261	8,667	75,725
Sutter	355		66	62	483
American	4,328		804	754	5,886
Yolo	25,755		4,484	4,015	34,254
Delta	10,053		1,843	1,650	13,546
Suisun	119,995		21,993	19,690	161,678
San Joaquin	181,676		19,922	15,403	217,001
Tulare	15,181		1,802	1,373	18,356

### B. Available Water for Private Wetlands in Sub-Region 7

source: calculated based on Step 2A and steps 1A, 1C, 1D, and 1E

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Seasonal	0.1	0.1	0.1	-	0.4	-	-	0.5	0.9	0.2	0.2	0.1	2.5
Semi-Perm.	0.0	0.0	0.0	0.0	0.0	0.1	0.1	-	-	0.2	0.0	0.0	0.5
Permanent	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.4
Total	0.1	0.1	0.1	0.1	0.4	0.1	0.1	0.5	1.0	0.4	0.3	0.1	3.5

### Step 3. Quantified Targeted Benefit Change

#### A. Additional Water Required for Optimum Management of Private Wetlands in Sub-Region

source: calculated: Step 1F- Step 2B

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Seasonal	0.0	0.0	0.0	-	0.1	-	-	0.1	0.3	0.1	0.1	0.0	0.8
Semi-Perm.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.1
Permanent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.3	0.1	0.1	0.0	1.0

### Step 4. Area Affected By Targeted Benefit

This analysis assumes that all of the agricultural lands in the sub-region could potentially contribute to the provision of additional waters for wetlands.

### Step 5. Water Flow Path Elements

#### A. Rain Sub-Region (inflow)

source: CVGSM Sub-Region 7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	18.4	14.0	7.2	4.7	5.4	1.8	0.0	0.5	1.1	6.0	9.6	16.1	84.9
2) Dry	19.5	20.0	18.9	8.3	3.8	0.9	0.0	0.2	2.9	5.2	14.5	21.4	115.5
3) B Norm	22.4	27.9	17.3	11.3	3.0	1.1	0.2	0.1	2.3	6.1	14.6	20.8	127.1
4) A Norm	38.0	37.2	21.5	9.1	4.1	0.1	0.2	0.3	2.2	9.6	17.7	19.9	159.9
5) Wet	38.7	29.0	26.6	18.4	3.0	1.9	0.4	0.6	1.8	11.7	27.1	37.6	196.8
Wtd Avg.	28.2	25.8	19.7	11.6	3.6	1.3	0.2	0.4	2.1	8.0	18.1	25.3	144.4

#### B. Surface Water Diversions Sub-Region (inflow)

source: CVGSM Sub-Region 7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	1.7	2.1	3.5	8.1	9.5	12.3	13.5	12.3	7.6	3.9	2.4	1.8	78.6
2) Dry	1.8	1.8	2.7	8.2	9.9	12.8	13.9	12.8	7.7	4.1	2.4	1.8	79.8
3) B Norm	1.8	1.7	2.8	8.1	10.0	12.8	14.0	12.8	7.8	3.9	2.4	1.8	79.9
4) A Norm	1.7	1.6	2.4	8.0	9.9	12.8	14.0	12.8	7.9	3.3	2.3	1.7	78.5
5) Wet	1.8	1.7	2.6	7.8	10.0	12.8	14.0	12.8	7.9	3.6	2.3	1.8	78.9
Wtd Avg.	1.8	1.8	2.7	8.0	9.9	12.7	13.9	12.7	7.8	3.8	2.4	1.8	79.2

#### C. Import Sub-Region (inflow)

source: CVGSM Sub-Region 7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	1.2	1.3	3.7	48.9	38.1	46.2	47.0	36.8	13.0	4.9	1.7	1.3	244.2
2) Dry	1.2	1.1	2.2	42.0	45.5	56.6	57.8	44.9	13.4	5.9	1.9	1.3	273.9
3) B Norm	1.3	1.1	2.7	37.6	48.3	59.3	61.9	50.9	15.1	5.3	1.8	1.3	286.5
4) A Norm	1.2	1.1	1.5	37.2	45.7	61.3	61.4	52.0	16.3	3.3	1.9	1.2	284.1
5) Wet	1.2	1.1	1.9	26.6	47.5	57.9	60.4	50.4	16.5	4.0	1.6	1.3	270.5
Wtd Avg.	1.2	1.1	2.3	36.7	45.8	56.8	58.5	47.7	15.0	4.7	1.8	1.3	272.9

D. Groundwater Pumping Sub-Region (inflow)

source: CVGSM Sub-Region 7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	2.0	2.6	5.9	61.4	48.8	70.9	71.8	50.8	10.6	4.5	2.9	2.1	334.4
2) Dry	2.1	1.9	3.0	47.7	45.2	64.3	60.9	42.6	9.2	4.5	2.8	2.1	286.2
3) B Norm	2.2	1.8	2.9	44.5	43.2	61.2	56.8	36.8	7.7	4.4	2.7	2.1	266.1
4) A Norm	2.0	1.8	2.8	42.3	42.9	60.9	56.6	35.6	7.0	4.4	2.7	2.1	261.1
5) Wet	1.9	1.8	3.1	41.5	42.4	61.5	57.5	36.6	6.8	4.2	2.7	2.1	262.2
Wtd Avg.	2.0	1.9	3.3	46.3	44.1	63.2	59.9	39.8	8.1	4.4	2.7	2.1	277.8

E. ET Rain Sub-Region (outflow, irrecoverable)

source: CVGSM Sub-Region 7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	4.7	8.2	8.6	-5.4	3.2	1.2	0.0	0.4	17.6	9.4	3.5	3.8	55.0
2) Dry	5.3	9.8	14.0	-2.0	2.7	0.7	0.0	0.3	20.4	8.8	3.5	4.4	68.0
3) B Norm	5.5	9.9	13.6	-0.7	2.1	0.9	0.2	0.1	23.3	10.0	3.4	4.3	72.6
4) A Norm	5.3	9.8	15.4	-0.4	2.4	0.0	0.2	0.3	23.2	13.5	2.8	4.2	76.6
5) Wet	6.3	10.1	14.6	4.5	1.8	1.4	0.3	0.7	23.7	13.1	5.0	5.7	87.2
Wtd Avg.	5.6	9.7	13.6	0.0	2.3	0.9	0.1	0.4	22.0	11.0	3.8	4.7	74.2

F. Runoff from Rain Sub-Region (outflow, irrecoverable)

source: CVGSM Sub-Region 7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	4.8	4.7	1.6	1.0	1.9	0.4	0.0	0.1	0.3	0.3	1.0	3.9	20.1
2) Dry	6.3	9.8	9.0	2.4	1.1	0.1	0.0	0.0	1.1	0.5	2.0	4.8	37.0
3) B Norm	7.9	15.7	8.4	4.1	0.9	0.1	0.0	0.0	0.7	0.5	0.8	4.5	43.5
4) A Norm	18.1	21.9	11.1	2.7	1.4	0.0	0.0	0.0	0.7	0.3	1.4	5.8	63.5
5) Wet	23.9	17.8	14.9	8.4	0.7	0.3	0.1	0.1	0.5	1.5	3.9	14.4	86.6
Wtd Avg.	13.3	14.4	10.0	4.4	1.1	0.2	0.0	0.0	0.7	0.7	2.1	7.7	54.7

G. ETAW Sub-Region (outflow, irrecoverable)

source: CVGSM Sub-Region 7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.0	0.9	6.4	36.6	48.3	64.9	69.8	58.4	24.7	8.2	0.6	0.0	318.8
2) Dry	0.0	0.1	1.3	33.2	48.7	65.4	69.8	58.4	21.9	9.3	0.6	0.0	308.7
3) B Norm	0.0	0.0	1.6	31.9	49.3	65.3	69.6	58.6	19.0	8.3	0.4	0.0	303.9
4) A Norm	0.0	0.0	0.1	31.6	49.0	66.1	69.6	58.5	19.1	4.6	0.7	0.0	299.3
5) Wet	0.0	0.0	0.9	26.7	49.6	64.7	69.5	58.0	18.5	5.0	0.0	0.0	293.0
Wtd Avg.	0.0	0.1	1.7	31.2	49.1	65.2	69.6	58.3	20.3	7.0	0.4	0.0	303.0

H. Export Sub-Region (outflow, irrecoverable)

source: CVGSM Sub-Region 7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	5.0	5.0	6.1	7.1	9.1	11.4	12.8	12.5	11.4	7.4	6.3	5.0	99.1
2) Dry	5.0	5.0	6.3	7.4	9.4	11.8	13.3	12.9	11.8	7.4	6.3	5.0	101.7
3) B Norm	5.0	5.0	6.4	7.4	9.4	11.9	13.3	13.0	11.9	7.4	6.3	5.0	102.1
4) A Norm	4.8	4.8	6.4	7.4	9.4	11.9	13.3	13.0	11.9	7.2	6.2	4.8	101.2
5) Wet	5.0	5.0	6.4	7.4	9.4	11.9	13.3	13.0	11.9	7.4	6.4	5.0	102.1
Average	5.0	5.0	6.3	7.4	9.4	11.8	13.2	12.9	11.8	7.4	6.3	5.0	101.5

I. Surface Runoff Sub-Region (outflow, recoverable)

source: CVGSM Sub-Region 7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.0	0.0	0.6	53.0	20.0	34.7	38.7	23.7	2.1	0.6	0.0	0.0	173.4
2) Dry	0.0	0.0	0.1	34.4	21.8	35.5	31.6	18.5	1.8	0.7	0.0	0.0	144.5
3) B Norm	0.0	0.0	0.1	28.0	21.8	32.7	27.7	13.7	1.6	0.6	0.0	0.0	126.3
4) A Norm	0.0	0.0	0.0	23.4	19.3	34.6	27.1	12.7	1.7	0.3	0.0	0.0	119.1
5) Wet	0.0	0.0	0.0	18.7	21.1	32.5	28.5	13.3	1.7	0.3	0.0	0.0	116.3
Average	0.0	0.0	0.1	29.3	21.0	33.8	30.2	15.9	1.8	0.5	0.0	0.0	132.7

J. Percolation to Groundwater Sub-Region (outflow, recoverable)

source: CVGSM Sub-Region 7

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	2.8	0.5	1.1	26.4	20.9	24.0	22.9	19.7	0.0	0.5	1.1	2.3	122.2
2) Dry	2.1	1.1	0.2	24.9	21.9	23.1	21.8	18.0	0.0	0.3	2.4	3.4	119.2
3) B Norm	2.4	2.4	0.2	22.4	20.4	23.0	21.3	16.5	0.0	0.4	3.3	3.1	115.3
4) A Norm	7.8	3.7	0.2	24.8	20.5	22.0	21.3	16.2	0.0	1.2	4.2	2.0	124.0
5) Wet	7.3	3.0	0.4	22.5	19.9	24.0	21.6	16.9	0.0	1.1	5.9	7.0	129.5
Average	4.6	2.2	0.4	23.8	20.7	23.3	21.7	17.4	0.0	0.7	3.7	4.1	122.6

K. Evaporation Flows Sub-Region

source: = 0.02 \* (Step 5B + 5C - 5H)

= 0.02 \* (Surface Water Diversion + Import - Export)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.0	0.0	0.0	1.0	0.8	0.9	1.0	0.7	0.2	0.0	0.0	0.0	4.5
2) Dry	0.0	0.0	0.0	0.9	0.9	1.2	1.2	0.9	0.2	0.1	0.0	0.0	5.0
3) B Norm	0.0	0.0	0.0	0.8	1.0	1.2	1.3	1.0	0.2	0.0	0.0	0.0	5.3
4) A Norm	0.0	0.0	0.0	0.8	0.9	1.2	1.2	1.0	0.2	0.0	0.0	0.0	5.2
5) Wet	0.0	0.0	0.0	0.5	1.0	1.2	1.2	1.0	0.2	0.0	0.0	0.0	4.9
Wtd Avg.	0.0	0.0	0.0	0.7	0.9	1.2	1.2	0.9	0.2	0.0	0.0	0.0	5.0

L. Sub-Region Water Balance

source: = Step 5.(A + B + C + D) - Step5. (E + F + G + H + I + J + K)

= (Rain + Surface Water Diversions + Import + Groundwater Pumping) - (ET Rain +

Runoff from Rain + ETAW + Export + Surface & Groundwater Return + Evaporation)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	6.1	0.8	-4.1	3.4	-2.3	-6.4	-12.8	-15.0	-23.9	-7.1	4.1	6.4	-50.9
2) Dry	5.8	-1.0	-4.1	5.1	-2.1	-3.4	-4.9	-8.7	-23.9	-7.5	6.8	9.1	-28.8
3) B Norm	6.9	-0.5	-4.8	7.6	-0.5	-0.5	-0.5	-2.3	-23.9	-7.5	7.4	9.3	-9.4
4) A Norm	7.0	1.6	-4.9	6.3	-0.4	-0.7	-0.6	-1.0	-23.4	-6.5	9.3	8.1	-5.2
5) Wet	1.2	-2.2	-3.0	5.5	-0.7	-1.8	-2.3	-2.7	-23.6	-5.0	12.6	10.7	-11.3
Wtd Avg.	4.8	-0.7	-4.0	5.7	-1.2	-2.4	-3.7	-5.4	-23.8	-6.6	8.7	9.1	-19.3

M. Applied Water Ratio Sub-Region

source: = Step 5G / Step 5 (B + C+ D - H)

= ETAW/(Surfce Water Diversions + Import + Groundwater Pumping - Export)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.00	0.88	0.92	0.33	0.55	0.55	0.58	0.67	1.25	1.40	0.85	0.00	0.57
2) Dry	0.00	-0.26	0.82	0.37	0.53	0.54	0.58	0.67	1.18	1.33	0.88	0.00	0.57
3) B Norm	0.00	0.00	0.83	0.39	0.54	0.54	0.58	0.67	1.02	1.33	0.65	0.00	0.57
4) A Norm	0.00	0.00	0.29	0.40	0.55	0.54	0.59	0.67	0.99	1.21	0.97	0.00	0.57
5) Wet	0.00	0.00	0.72	0.39	0.55	0.54	0.59	0.67	0.96	1.14	0.00	0.00	0.58
Wtd Avg.	0.0	0.1	0.7	0.4	0.5	0.5	0.6	0.7	1.1	1.3	0.6	0.0	0.6

## N. Groundwater Check Sub-Region

source: = Step 5 (J - D)

= Groundwater Return Flows - Groundwater Pumping

	Thousand Acre Feet												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	0.8	-2.1	-4.8	-35.0	-27.9	-46.9	-48.9	-31.1	-10.6	-4.0	-1.7	0.2	-212.1
2) Dry	0.1	-0.8	-2.9	-22.8	-23.3	-41.2	-39.1	-24.6	-9.2	-4.1	-0.3	1.3	-167.0
3) B Norm	0.3	0.6	-2.7	-22.1	-22.8	-38.2	-35.5	-20.3	-7.7	-4.0	0.6	1.0	-150.8
4) A Norm	5.7	1.8	-2.6	-17.5	-22.4	-38.9	-35.3	-19.4	-7.0	-3.1	1.5	0.0	-137.2
5) Wet	5.3	1.2	-2.6	-19.0	-22.6	-37.5	-35.9	-19.7	-6.8	-3.1	3.2	4.9	-132.6
Wtd Avg.	2.5	0.2	-3.0	-22.4	-23.4	-39.9	-38.2	-22.4	-8.1	-3.6	1.0	2.0	-155.3

## 6. Idealized Agricultural Potential

### A. Export Adjustment

92% of Export (Step 5H.) water is available for flow/timing changes in Sub-Region

note: Import (Step 5C) and Export (Step 5H) are in the water balance. In this Step (7D) Export water is considered water that flows through districts in Sub-Regions 4, 5, and 7. This water is available to make flow/timing changes

	Thousand Acre Feet												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	5.6	6.6	8.4	10.5	11.8	11.5	10.5	6.8	---	---	71.6
2) Dry	---	---	5.8	6.8	8.7	10.9	12.2	11.9	10.9	6.8	---	---	74.0
3) B Norm	---	---	5.9	6.8	8.7	10.9	12.2	11.9	10.9	6.8	---	---	74.3
4) A Norm	---	---	5.9	6.8	8.7	10.9	12.2	11.9	10.9	6.6	---	---	74.1
5) Wet	---	---	5.9	6.8	8.7	10.9	12.2	11.9	10.9	6.8	---	---	74.3
Wtd Avg.	N/A	N/A	5.8	6.8	8.6	10.9	12.2	11.9	10.9	6.8	N/A	N/A	73.8

### B. Idealized Agricultural Potential

source: = Step 5 ((B + C + D) + Step 6A. - Step 5 (G + H))

= Surface Water Diversions + Import + Groundwater Diversions) - (ETAW + Export  
+ Export Adjustment)

	Thousand Acre Feet												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	6.2	81.3	47.4	63.6	61.5	40.6	5.6	4.5	---	---	310.6
2) Dry	---	---	6.1	64.1	51.2	67.3	61.8	40.7	7.6	4.5	---	---	303.4
3) B Norm	---	---	6.2	57.6	51.3	67.0	62.0	40.8	10.6	4.8	---	---	300.4
4) A Norm	---	---	6.1	55.2	48.8	68.0	61.4	40.9	11.2	5.8	---	---	297.4
5) Wet	---	---	6.2	48.5	49.6	66.5	61.2	40.8	11.6	6.2	---	---	290.7
Wtd Avg.	N/A	N/A	6.2	59.1	49.9	66.6	61.6	40.8	9.7	5.3	N/A	N/A	299.1

## 7. Achievable Agricultural Potential

### A. Farm Demand

assumes farm loss fraction of 0.14 for Sub-Region , values vary by SubRegion

source: = ETAW / Farm High (1- loss fraction)

	Thousand Acre Feet												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	7.5	42.6	56.1	75.5	81.2	67.9	28.7	9.5	---	---	368.9
2) Dry	---	---	1.5	38.6	56.7	76.0	81.2	67.9	25.4	10.8	---	---	358.2
3) B Norm	---	---	1.8	37.1	57.4	75.9	80.9	68.2	22.0	9.6	---	---	352.9
4) A Norm	---	---	0.1	36.8	57.0	76.9	80.9	68.0	22.2	5.3	---	---	347.2
5) Wet	---	---	1.0	31.1	57.7	75.2	80.8	67.5	21.6	5.8	---	---	340.7
Wtd Avg.	---	---	2.0	36.3	57.1	75.8	81.0	67.8	23.6	8.2	---	---	351.7

B. Groundwater Pumping after System Improvements

Existing Farm Efficiency for Sub-Region = 0.70

source:  $= (1 - 0.7 * (1/0.7 - 1/(1 - \text{Farm Loss Fraction}))) * \text{Groundwater Pumping}$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	4.8	50.0	39.7	57.7	58.4	41.3	8.7	3.7	---	---	264.4
2) Dry	---	---	2.5	38.9	36.8	52.3	49.6	34.6	7.5	3.6	---	---	225.8
3) B Norm	---	---	2.3	36.2	35.1	49.8	46.2	30.0	6.2	3.6	---	---	209.4
4) A Norm	---	---	2.3	34.4	34.9	49.6	46.1	29.0	5.7	3.5	---	---	205.5
5) Wet	---	---	2.5	33.8	34.6	50.0	46.8	29.8	5.5	3.4	---	---	206.4
Wtd Avg.	---	---	2.7	37.7	35.9	51.5	48.7	32.4	6.6	3.5	---	---	219.0

C. Farm Demand not met by Groundwater Pumping

source:  $= \text{Step 7.A} - \text{Step 7.B}$

$= \text{Farm Demand} - \text{Groundwater Pumping}$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Thousands Acre Feet
1) Critical	---	---	2.7	-7.4	16.4	17.7	22.7	26.5	20.1	5.8	---	---	104.5
2) Dry	---	---	-0.9	-0.2	19.9	23.7	31.6	33.3	17.9	7.2	---	---	132.4
3) B Norm	---	---	-0.5	0.8	22.2	26.1	34.7	38.2	15.8	6.0	---	---	143.5
4) A Norm	---	---	-2.1	2.4	22.1	27.3	34.8	39.0	16.5	1.8	---	---	141.7
5) Wet	---	---	-1.5	-2.7	23.2	25.2	34.1	37.7	16.0	2.4	---	---	134.3
Wtd Avg.	---	---	-0.7	-1.4	21.2	24.3	32.2	35.5	17.0	4.6	---	---	132.8

D. Water Supplier Delivery to Meet Farm Demand

assumes district loss fraction of 0.08

source:  $= \text{Step 7C} / \text{District High (1 - loss fraction)}$

$= \text{Farm Demand not met by Groundwater Pumping} / (1 - 0.08)$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Thousands Acre Feet
1) Critical	---	---	2.9	-8.1	17.8	19.3	24.7	28.9	21.8	6.3	---	---	113.6
2) Dry	---	---	-1.0	-0.2	21.6	25.8	34.3	36.2	19.5	7.8	---	---	143.9
3) B Norm	---	---	-0.5	0.9	24.2	28.4	37.7	41.6	17.2	6.6	---	---	156.0
4) A Norm	---	---	-2.3	2.6	24.0	29.7	37.8	42.4	17.9	2.0	---	---	154.0
5) Wet	---	---	-1.6	-3.0	25.2	27.4	37.0	40.9	17.4	2.6	---	---	145.9
Wtd Avg.	---	---	-0.8	-1.5	23.0	26.5	35.0	38.6	18.5	5.0	---	---	144.3

E. Achievable Agricultural Potential

source = Step 5.(B + C - H) + Step 6A - Step 7D.

$= \text{Surface Water Diversions} + \text{Import} - \text{Export} + \text{Export Adjustment} - \text{Water Supplier Delivery to Meet Farm Demand}$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Thousands Acre Feet
1) Critical	---	---	3.8	64.5	29.0	38.3	34.8	19.3	0.0	1.8	---	---	191.5
2) Dry	---	---	5.4	49.8	33.1	42.6	36.4	20.4	0.8	1.5	---	---	190.1
3) B Norm	---	---	5.4	44.1	33.3	42.7	37.1	21.1	4.8	2.1	---	---	190.6
4) A Norm	---	---	5.8	42.0	30.9	43.5	36.5	21.4	5.3	4.1	---	---	189.5
5) Wet	---	---	5.6	36.7	31.6	42.4	36.3	21.2	6.0	4.4	---	---	184.1
Wtd Avg.	---	---	5.3	45.6	31.9	42.1	36.3	20.8	3.6	2.9	---	---	188.5

F. Groundwater Check after System Improvements

source =  $(0.14 * 0.80 * \text{ETAW}) + (0.04 * (\text{Farm Demand w/o Groundwater} - \text{Water Supplier Delivery})) - \text{Groundwater Pumping}$

	Thousand Acre Feet												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1) Critical	---	---	-5.2	-57.3	-43.5	-63.7	-64.1	-44.3	-7.9	-3.6	---	---	-289.6
2) Dry	---	---	-2.9	-44.0	-39.8	-57.0	-53.2	-36.1	-6.9	-3.4	---	---	-243.4
3) B Norm	---	---	-2.7	-40.9	-37.7	-53.9	-49.1	-30.4	-5.6	-3.5	---	---	-223.8
4) A Norm	---	---	-2.8	-38.7	-37.5	-53.6	-49.0	-29.2	-4.9	-3.8	---	---	-219.5
5) Wet	---	---	-3.0	-38.5	-37.0	-54.3	-49.8	-30.3	-4.8	-3.6	---	---	-221.3
Wtd Avg.	---	---	-3.2	-42.8	-38.7	-56.0	-52.2	-33.3	-5.9	-3.6	---	---	-235.6

**8. Quantifiable Objective**

source = min(Step 3A Wtd Avg, Step 7E)

	Thousand Acre Feet												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wtd Avg	---	---	0.0	0.0	0.1	0.0	0.0	0.2	0.3	0.1	---	---	0.8